

Surface Warfare

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Winter 2012

Developing Capabilities

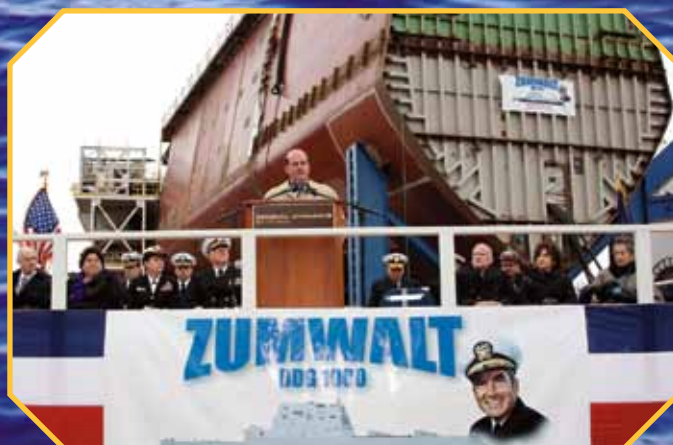
FROM THE WAR OF 1812...
TO 2012...

Inside:

Coming to Life
DDG 1000

A Four-Phased Approach
Future of BMD

LCS Missile Module
Griffin Incoming





On the Cover:

This year marks the bicentennial celebration of a significant event – the War of 1812 – in the Navy’s commitment to preserving the freedom of the seas, with coverage of the celebration and war continuing through the year. This issue of *Surface Warfare* examines the capabilities, including DDG 1000, the surface fleet is developing to preserve the freedom of the seas, vital to our nation’s territorial and economic security. (U.S. Navy illustration)



On the Back:

The ONR-funded shipboard autonomous firefighting robot (SAFFiR) is a human-sized robot that will be capable of finding and suppressing shipboard fires and working seamlessly with human firefighters. In development at the Robotics & Mechanisms Laboratory at Virginia Tech, SAFFiR is a key component of the Innovative Naval Prototype program Damage Control Technologies for the 21st Century. (Illustration courtesy of Office of Naval Research)

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◀ DCC(SW/AW) Lamanski Finch, right, instructs DC3 Bonnie Reina on fire-hose handling techniques during a general quarters drill aboard USS *Truxtun* (DDG 103). (MC2(SW/AW) Tony Curtis/USN)

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I.M. COOL

A coping methodology for a bad day

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The secret life of Navy CTs

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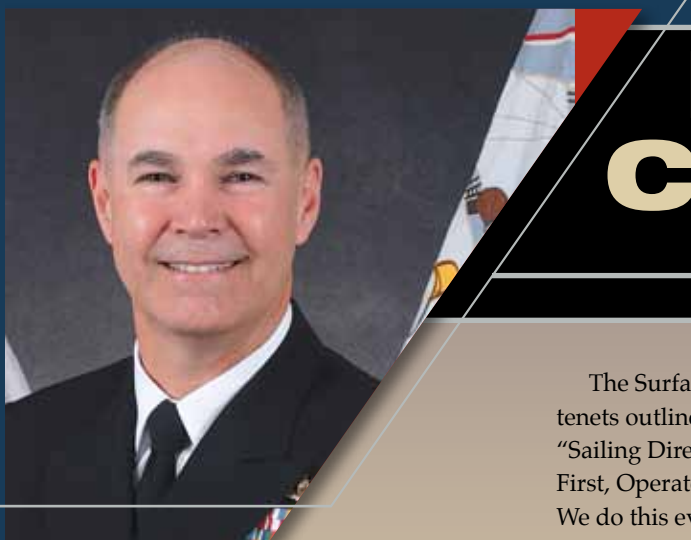
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Force Commander's CORNER

Surface Warriors,

The year 2011 was full of great accomplishments for our Naval Surface Force. On any given day our ships and Sailors were in every region in the world professionally executing across the full spectrum of our capabilities. In the second week of March, the Surface Navy conducted kinetic strike support for Operation *Odyssey Dawn* in the Mediterranean; Navy and Marine Corps elements from USS *Kearsarge* (LHD 3) conducted a tactical recovery of a downed Air Force pilot in the heart of the Libyan combat zone; 7th Fleet ships executed critical humanitarian assistance / disaster relief in support of Operation *Tomodachi* following the earthquake / tsunami tragedy in Japan; USS *Carl Vinson* (CVN 70) Carrier Strike Group provided sorties to coalition ground forces in Afghanistan; USS *Doyle* (FFG 39) conducted counter-illicit trafficking operations in the U.S. Southern Command area of responsibility; and USS *Robert G. Bradley* (FFG 49) established a training hub in Freetown, Sierra Leone, as part of *Africa Partnership Station West*. That same week, others were forward on global deployments ensuring maritime security, conducting ballistic missile defense, and undertaking invaluable partnership missions in support of the theater objectives set by our regional combatant commanders. Every week, the Surface Force remains uniquely positioned to stay in constant contact with allies, partners, and others, consistently influencing the maritime domain by our presence. We did this without fail throughout 2011.

The Surface Force embodies the three tenets outlined by the CNO in his 2011 "Sailing Directions" – "Warfighting First, Operate Forward, and Be Ready." We do this every day in an uncertain and demanding strategic environment. Uncertainty is as significant a threat as anything we have faced in previous generations. To succeed in this uncertain environment, we must man, train, and equip our Surface Navy to be able to rapidly adjust and adapt.

Our Sailors remain our most valuable resource. In 2012, we will focus on the professional development of our Sailors, both officers and enlisted. For officers, we are re-establishing Basic Division Officer Course and reviewing the division officer sequencing plan. For our enlisted Sailors, we are committed to proper manning, to include necessary Navy enlisted classifications (NECs). We will work to achieve proper sea-shore rotation, providing enriching shore assignments to foster an apprentice / journeyman / master development. Focusing on our people to produce ready and trained forces with credible combat capability for our ships is at the top of our priority list.

The United States has significant naval advantage globally. Key to our future security is the need to continually develop and sustain this advantage. To do so, we must think innovatively – honing our warfighting skills and boldly experimenting with new tactics and concepts of operation. We will explore cutting-edge technologies with the potential to revolutionize the way we do business. Energy weapons are at the forefront of game-changing technology with applications for the Surface Force, including electromagnetic railgun and lasers.

Our Surface Force is the leader in Theater Security Cooperation. *Pacific Partnership*, *Africa Partnership Station*, *Southern Partnership*

Station, and others are a key component in our global engagement and have long term positive benefits. We must continue to build trust and confidence with allies, deter potential adversaries, and encourage those yet undecided to partner with the United States. We demonstrate our commitment to freedom of the seas by providing sustained credible combat power, on station...always prepared. We are unmatched in this area. The Navy as a whole is charged with preventing conflict, protecting the nation, and prevailing when called upon.

As we move into the New Year, we will continue to advance the Littoral Combat Ship program and move forward with LPD 17, DDG 51 Flight III and DDG 1000. We are actively working to improve Aegis wholeness by reducing and stabilizing system baselines and ensuring interoperability with our Ship Self-Defense System (SSDS) ships. Our approach to improving the material condition of our ships is built around correct fiscal resourcing, re-establishing accountability, and improving upon our culture of ownership. To that end, we have added rigor to our maintenance practices with the introduction of a Total Ship Readiness Assessment process and by developing the Surface Force Readiness Manual.

Our Surface Force is crucial to keeping our nation secure. Maintaining our presence forward and improving our tactical advantage ensures that we are ready to meet any challenge. I thank each of you for your dedication and professional service to our Navy and Nation. Be proud of all you do; I am very proud to call each of you "Shipmate."

Richard W. Hunt
Vice Admiral, U.S. Navy
Commander, Naval Surface Forces

Director's LETTER

Surface Warriors!

As Director, Surface Warfare Division on the staff of the Chief of Naval Operations (OPNAV N86), I work with many dedicated and hard-charging Sailors and civilian personnel across the Surface Warfare Enterprise. It is an honor to acknowledge their tireless professional efforts, and a privilege to serve with them. I'd also like to add that all of these efforts are geared towards you, the fleet Sailor. Our mission at N86 is to provide the most capable and cost-effective means of meeting the needs of our nation's maritime strategy. We deliver tools for our surface fleet to meet our CNO's tenets as outlined in his 2011 "Sailing Directions"; Warfighting First, Operate Forward, Be Ready.

This issue of *Surface Warfare* looks at new capabilities the Navy is developing to increase the effectiveness of our surface force. The article "Griffin

Incoming" showcases the Griffin missile and the rest of the Littoral Combat Ship's Surface Warfare Mission Package. "Reinvigorating the Navy's Amphibious Workhorses," by Rear. Adm. James McManamon, details the extensive effort going into the modernization of the Navy's dock landing ships. And don't miss "The Future of Sea-Based Air and Missile Defense," which depicts the advantages and development of the air and missile defense radar for a future Flight III of our *Arleigh Burke*-class destroyers.

The surface fleet has also been personally called upon by President Obama to provide an integral portion of the Ballistic Missile Defense (BMD) of our forces and allies abroad. We are meeting the challenge by increasing our BMD capabilities afloat and ashore through the dedicated training of personnel and fleet exercises, and improving technology and equipment. In Europe this strategy is encapsulated in the European Phased Adaptive Approach, with USS *Monterey* (CG 61) the first ship to deploy to the region last summer in support of this critical mission.

DDG 1000 is another program that will provide extraordinary capability and flexibility for our fleet. I had the honor in November of attending the keel laying of the lead ship of this remarkable new class – the future USS *Zumwalt* (DDG 1000),

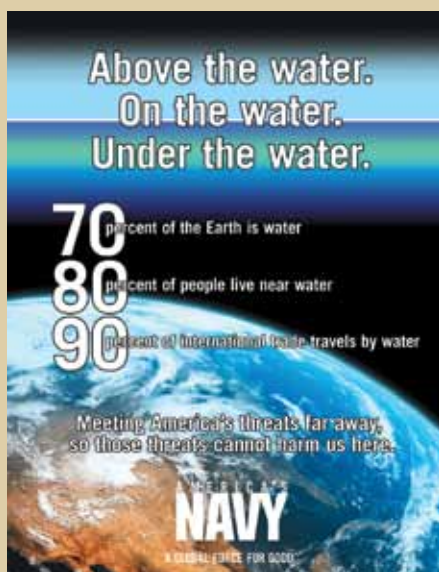
in Bath, Maine. The ship's namesake – former Chief of Naval Operations Adm. Elmo Zumwalt – was a visionary leader. His Z-grams pushed the Navy to eliminate discrimination within the ranks, give junior Sailors a greater amount of responsibility, and establish what is now known as the Command Master Chief program.

Befitting Adm. Zumwalt's impact, DDG 1000 will be an operational ship-of-the line that also proves a range of new technologies. These innovative advances effect every aspect of shipboard life – from engineering to combat systems, and from watchstations to berthing. *Zumwalt* will arrive as a cutting-edge warship ready to support global operations.

Finally, I'd like to wish the men and women of our Surface Force a very happy – and, most important – a very safe New Year whether at sea or ashore, in homeport or deployed. For our deployed personnel, this may be an especially difficult time of year. In keeping with Adm. Zumwalt's fervent wish to make every Sailor a more responsible and supportive shipmate I ask each of you to look out for one another.

Each of you has my admiration, my support, and my unswerving loyalty. Thank you for your service. I can't wait to see you out in the fleet!

Ann Phillips
Rear Admiral, U.S. Navy
Director, Surface Warfare



Sometimes the tough work and daily grind of the Surface Warrior obscures the long-term remarkable achievements of our Navy. It can be hard to gain perspective on the big picture of the fleet when dealing with one immediate task after the next. If you haven't had a chance to think about it much, there are some big changes coming to our surface force in the very near future. This issue of *Surface Warfare* takes a look at some of the developing capabilities that will have a large impact on our fleet in the years and decades ahead.

In addition to the revolutionary new littoral combat ships now coming online and covered extensively in previous issues, the new *Zumwalt*-class destroyers will both prove and provide remarkable new abilities. The Navy laid the keel for the first of the line, USS *Zumwalt* (DDG 1000), this November in Bath, Maine, and she will enter the fleet in 2014. When she does, she will bring new systems including her Integrated

Power System, Total Ship's Computing Environment, and Advanced Gun System. Be sure to check out our feature stories to learn more.

Another feature of our evolving fleet has been the continued development of the Ballistic Missile Defense (BMD) mission area. Delivering a vital in-service function that no other service or branch can perform, our Aegis-equipped destroyers and cruisers have already played an integral part in our President's Phased Adaptive Approach to provide for the defense of our forces, allies, and partners. The future of BMD includes a joint integrated approach that moves Aegis and Sailors ashore in Europe and continues improvements seen in technology, training, and planning systems.

These examples just scratch the surface of the surface fleet's capabilities under development, and are but a few that we hope you'll enjoy in the magazine! 🚢 🚢

Coming Next Issue:

Managing Your Naval Career



NCC(SW/AW) Nadine Fridy discusses the Navy's Fleet Ride and Perform to Serve programs with departmental career counselors aboard USS *Bataan* (LHD 5) on the ship's mess decks. (MC1 Elijah Leinaar/USN)

Looking Back at Surface Warfare

1975 Surface ship Vertical Launch System tests confirm the capability of the Aegis Weapon System and SM-2 Block II

1982 Reorganization of Surface Forces under COMNAVSURFLANT and COMNAVSURFPAC leads to the beginning of *Surface Warfare* magazine

1992 *Surface Warfare* highlights the extraordinary efforts of the Navy SEALs and the role they play in defending from the sea

2002 The Navy celebrates the 100th anniversary of the guided-missile destroyer, also known as the "grayhound of the fleet"

2012

In the next few issues you'll see **BIG CHANGES** to the look of *Surface Warfare*. Let us know what you think at surfwarfmag@navy.mil.

Retooling Sailors

NAMTS Program offers opportunities for superior maintenance training

By Fred Henney, Navy Regional Maintenance Command Public Affairs

Filling the Gaps

For the last two decades, the NAMTS program has trained Sailors at maintenance facilities ashore for specific engineering tasks and returned to afloat commands a pool of highly trained engineering-repair journeymen. NAMTS thus provides proficient Sailors to perform essential maintenance and emergent repairs to the operating surface forces.

Strike Groups deploy with Battle Force Intermediate Maintenance Activities and Amphibious Ready Group Intermediate Maintenance Activities made up of Sailors from these strike groups. If an emergent repair is required, these Sailors cross-deck to the ship needing repairs.

However, the reduction of Shore Intermediate Maintenance Activities (SIMAs) and other shore activities impacted the number of trained Sailors who could do journeyman-level shipboard repair work. With fewer SIMAs there were fewer available maintenance-training sites with hands-on training opportunities. Consequently, fewer Sailors had the skills or knowledge to do emergent repairs.

NAMTS Today

During the past year, the NAMTS management function transitioned to a newly established Naval Sea Systems (NAVSEA) command, Navy Regional Maintenance Center (NRMC), stood up in December 2010. Almost immediately, NRMC began an effort to reconstitute the Regional Maintenance Centers (RMCs) and bring back many capabilities lost when the SIMAs and tenders went away. By bringing back intermediate-level

(I-Level) capability and capacity at the RMCs, Sailors again have a place for journeyman-level training.

At RMC Intermediate Maintenance facilities, Sailors have excellent opportunities to receive hands-on experience in technical ratings. Sailors with Navy enlisted classifications (NECs) are detailed to NAMTS NEC-coded afloat billets to increase shipboard self-sufficiency with the ability to self-assess, fix problems, and train other Sailors.

"When you have the opportunity to serve the Navy at an intermediate maintenance facility, you are definitely going to return to the fleet with a great deal of experience taken from civilian mechanics," said Chief Machinist Mate (SW / AW) Robert Purviance, who earned NAMTS NECs as a valve-repair technician and outside machinist.


"The civilian mechanics at intermediate facilities have excellent resident knowledge and practice the highest quality maintenance standards you may ever see. This is an opportunity to learn from the professionals," he said. "NAMTS job qualification requirements (JQRs) provide a formal way of ensuring you get everything these mechanics offer. This guarantees exposure to all facets of the NEC and a multitude of mechanics."

The NAMTS program at the RMCs provides Sailors in engineering ratings with the knowledge and proficiency to perform essential maintenance and repairs to operating surface forces. Sailors in pay grades E-3 to E-6 and eligible for a follow-on sea tour can apply for JQR opportunities. Once Sailors enroll

with the NAMTS program, hours spent towards the JQR can also be applied to the United States Military Apprenticeship Program certification.

Sailors wondering about NAMTS' value should understand that this unique program is the only one in the Navy where they will be exposed to the experience and expertise of civilian journeymen showing them how to ply their trade. Consider the case of Senior Chief Gas Turbine System Technician (GSCS) (SW) Marcus Raschke, who earned a Gas Turbine Repair NEC through NAMTS.

"When I was an E-6, I obtained my NAMTS certification at the IMA in Everett, then went aboard USS *Mommsen* (DDG 92), where I made chief petty officer, then senior chief petty officer," said GSCS Raschke, serving as the Marine Gas Turbine Inspector (MGTI) in the 5th Fleet. "When I went aboard the ship, the chief engineer viewed me as the go-to person for the engineering plant. The NAMTS program certainly deserves some credit for positioning me for success," he said.

"Sailors with NAMTS NECs are valuable to deployed ships. They can help plan and assist the MGTI with intermediate shipboard repairs while saving the Navy considerable expenditures for fly-away-team costs," GSCS Raschke added. Interested Sailors should talk to their command career counselors to find out more about these billets. Sailors can also walk over to their local RMC or IMA for a first-hand look at the equipment and talk with the Sailors operating the gear. 

▼ HT3 Michael Evans grinds a weld aboard submarine tender USS **Emory S. Land** (AS 39). NAMTS seeks to restore training opportunities that disappeared with the destroyer tenders for rates such as HTs. (MC2 Chris Williamson/USN)



An Ultra Endeavor, Together

The Modular Construction and Delivery of Zumwalt

By Lt. Cmdr. Jay Sego, DDG 1000 Section Head, PMS 500



▲ Mouzetta Zumwalt-Weathers, left, authenticates USS **Zumwalt** (DDG 1000) by signing her initials on the ship's keel plate. (Michael Nutter/General Dynamics)

USS **Zumwalt** (DDG 1000) is the lead ship of three next-generation multi-mission destroyers under construction at Bath Iron Works (BIW) and Huntington Ingalls Industries (HII). In the late fall of 2011, the ship was more than 60 percent complete, and BIW on track to deliver DDG 1000 in the summer of 2014. Construction of DDG 1000 is unique among surface shipbuilding programs. Under a collaborative work-share agreement between the two Navy destroyer shipbuilding yards, BIW is building the majority of the ship in Bath, Maine, while HII is building the Peripheral Vertical Launch System (PVLS) units, the composite deckhouse, and the composite hangar.

HII splits its DDG 1000 work between Gulfport and Pascagoula, Miss., fabricating the PVLS units and steel deckhouse components at its main yard

facility in Pascagoula and completing all composite-related work in Gulfport. Within the climate-controlled Gulfport facility, specially constructed for the DDG 1000 program, HII fabricates composite panels and joins parts from raw materials using techniques developed with Navy support. To integrate the pieces, the steel deckhouse unit is shipped to Gulfport and the composite design modules are assembled vertically until the entire deckhouse unit is complete. The result is a massive structure – 155 feet long, 60 feet wide, and 50 feet high – weighing approximately 1,000 tons. The deckhouse, PVLS, and hangar will be shipped to BIW during the winter and spring of 2012 using commercial barges.

A major phase of ship construction occurs in the BIW shipyard's 77,000-square-foot Ultra Hall facility. With significant lifting space and a climate-controlled environment, BIW can assemble and outfit entire sections of the ship in the facility, keel to weather deck, some displacing more than 4,000 tons. Once assembled in the Ultra Hall, the "Ultra units" are transported using multiple self-propelled platform vehicles to the Land-Level Transfer Facility (LLTF) and set in place on one of the building



◀ The keel plate for the USS **Zumwalt** (DDG 1000), authenticated by Ann Zumwalt and Mouzetta Zumwalt-Weathers, the ship's co-sponsors, and Marine Corps Lt. Col. James Zumwalt and Elmo Zumwalt III. (Michael Nutter/General Dynamics)



USS **Zumwalt** (DDG 1000)'s tumblehome hull takes shape.

shipways. There, Ultra units and other ship modules are joined together on the LLTF to form a near-finished product.

The most important frame on any ship is the centerline longitudinal, otherwise known as the keel. The keel serves as the backbone of the ship, providing the major source of structural strength to the hull. Before the advent of modular ship construction methods, the keel was generally the first part of a ship's hull to be constructed, and laying the keel, or placing it in the cradle in which the ship would be built, was a significant event in a ship's construction. No matter the construction method, laying the ship's keel structure in a straight, fair, and true manner is critical to the proper construction and operating life of the vessel, and serves as a major milestone.


On Nov. 17, 2011, the ship completed a significant milestone at BIW – the keel laying. The Ultra unit that was used for laying **Zumwalt's** keel displaced some 4,000 tons – one

of the largest units ever used for a keel laying in naval shipbuilding history. Admiral Elmo Zumwalt's surviving children – Ann Zumwalt and Mouzetta Zumwalt-Weathers, co-ship sponsors, and Jim Zumwalt – authenticated the ship by inscribing their initials in the steel and announcing that the keel had been “truly and fairly laid.”

Following the keel laying, **Zumwalt** will undergo rigorous tests, trials, and certifications prior to delivery to the Navy in July 2014. Significant events in that process include the gas turbine generator light-off and the ship's float off, when the ship is physically transferred from the LLTF to the water in 2013. In the spring of 2014, **Zumwalt** will get underway for builder's and acceptance trials, when all of her hull, machinery, and electrical equipment and systems will be operated, tested, and inspected prior to delivery.

Following delivery, the Navy will spend another year integrating, operationally testing, and aligning all of the ship's mission systems in the

shipyard and underway to perform the ship's future warfighting missions – a phase of construction known as mission systems activation (MSA).

After MSA, the ship's crew will move aboard and prepare the ship for sail away and commissioning in 2015. **Zumwalt** will then participate in numerous inspection and qualification trials followed by a post-shakedown availability as she is readied for service in the fleet. **Zumwalt's** final new-construction milestone will be achieving initial operating capability in 2016. When all of **Zumwalt's** systems are on-line, the process of her modular construction will be just one of the features that makes her exceptional. As Director, Surface Warfare Division on the staff of the Chief of Naval Operations, Rear Adm. Ann Phillips said at the keel laying ceremony, “This innovative warship and her technology will take us forward as we build our fleet in the decades to come, exactly in the spirit of the name **Zumwalt**.” 

Systems of Change

By Lt. Cmdr. Jay Sego, DDG 1000
Section Head, OPNAV N863 and
Capt. Jim Downey, DDG 1000
Program Manager, PMS 500

Inside DDG 1000's New Engineering, Computing, and Weapon Systems

With production of DDG 1000 well underway, testing on new systems continues apace. While the striking silhouette of the integrated deckhouse may be the first thing to catch Sailors' eyes, a closer look reveals a multitude of remarkable new features. These will affect the ship to its core – how it moves through the water, keeps its lights on, gets its work done, and fights.

The Heart of *Zumwalt*: Integrated Power System

USS *Zumwalt* (DDG 1000) is the first U.S. Navy surface combatant to employ an innovative and highly survivable integrated power system (IPS). Key design features that make the IPS architecture unique include the ability to provide power to propulsion, ship's service, and combat system loads from the same gas turbine prime movers.

All 78 megawatts of installed electric power, more than eight times the amount generated by DDG 51-class ships, can be allocated based on operational requirements. DDG 1000's power allocation flexibility allows for energy savings and is well suited to enable future high-energy weapons and sensors. Making way at 20 knots, the ship still has 58 megawatts (74 percent of its power) available for ship systems. The ship will have the largest advanced electrical propulsion motors ever used on a surface combatant (34.6 megawatts), precluding the need for

dedicated propulsion prime movers and the traditional reduction gear. The DDG 1000 IPS is the first to introduce a high-voltage (4160 VAC) integrated power system (HVPS) consisting of new-to-the-Navy hardware components. The ship will also be the first surface combatant to use a low-voltage power system (LVPS) that features a highly survivable integrated fight-through power (IFTP) system. The IFTP distributes 1000 volts of direct current via two longitudinally segregated buses (port and starboard) in four electrically isolated zones (forward to aft) with extensive use of solid state power conversion modules (PCM).

Helping manage the use of power supplied by the IPS is the ship control system (SCS). The SCS and its integration into the total ship computing environment (TSCE) on DDG 1000 are considerably more sophisticated than on ships currently in commission. The fully automated, hierarchical control architecture is designed to dynamically reconfigure the IPS and provide power management to maintain continuous operation with graceful degradation.

Significant testing efforts continue on the IPS. Critical to the program's production timeline is the IPS commissioning and integration testing conducted at the IPS land-based test site (LBTS), in Philadelphia, Pa., where affordable full-scale testing is taking place to ensure the system is ready

for sea. LBTS demonstrated a full-power run in May 2011, including the Advanced Induction Motor, and is testing the ability to control the IPS through the highly automated Engineering Control System that facilitates automated plant operation and monitoring.

Total Ship Computing Environment (TSCE)

As a firm fixture and critical enabler of future capabilities, afloat computing power also received a substantial boost. The DDG 1000 TSCE is an integrated, open system computing and information architecture supporting execution of all tasks required by ship's missions. The system collects, processes, posts, and disseminates strategic, operational, and tactical information. TSCE consists of three major elements: mission area applications, TSCE infrastructure (TSCEI), and distributed adaptation processors (DAPs).

Mission area applications are essentially the software that executes the DDG 1000 mission functions. TSCEI is an integrated suite of standardized hardware, operating system, middleware, and infrastructure services. It forms the backbone of the enterprise-network computing system on which all DDG 1000 mission area applications run. The DAPs act as the interfaces between the core infrastructure and external equipment, such as IPS, weapons,



▲ The portside Advanced Induction Motor, one of two large electric propulsion motors that drive DDG 1000, is loaded into an Ultra Module at Bath Iron Works in Bath, Maine. (*Bath Iron Works*).

and communications systems. They are made up of simple rack-mounted processors, ruggedized ship structure-mounted processors, or single-board computers similar to those already in the fleet. TSCE uses common, advanced workstations and has a single backbone network that incorporates multi-level security.

TSCE represents a major advancement in Navy shipboard computing infrastructure and development processes and plays an essential role in the revolutionary capabilities provided by the DDG 1000 platform and the shipboard experience for a *Zumwalt* Sailor.


Land Attack

To provide an edge in combat and support for forces ashore, the Navy has developed the long-range land attack projectile (LRLAP). LRLAP is a 155mm, gun-launched, rocket-assisted guided projectile that will provide a much-needed high-volume, precision

land-attack capability. It will be launched from the Navy's Advanced Gun System (AGS) and provide a significant improvement over existing ship gun ammunition with respect to lethality, accuracy, and range. LRLAP munitions employ a GPS-based guidance system, unitary warhead with a height-of-burst fuse and is launched using a unique propelling charge developed specifically for this application. LRLAP has a required maximum range of 63 nautical miles, satisfying Marine Corps requirements for Naval Surface Fire Support. The program is in the system design and demonstration (SDD) phase, which will conclude with initial production in fiscal year 2013.

Most design work is complete, and efforts are focused on conducting a total of 35 guided flight tests at the White Sands Missile Range in southern New Mexico. During recent guided flight tests in the summer of 2011 the Navy successfully executed two

mid-range missions with both rounds accurately flying to a 45 nautical mile aim-point and destroying target sets. In prior guided flight tests, the program demonstrated the 63 nautical mile maximum range. The program, a collaborative effort between the Navy, BAE Systems, and Lockheed Martin, is scheduled to proceed with low-rate initial production and ship integration during fiscal year 2014, leading to sea trials in fiscal year 2015. LRLAP and DDG 1000 initial operational capability (IOC) are projected for fiscal year 2016.

The future is nearly here. State of the art propulsion, computing, and weapon systems are being completed and installed on *Zumwalt* for testing in 2012. These systems and their cutting-edge capabilities will enable the Navy to man this state-of-the-art warship with a crew of 120 officers and Sailors plus an aviation detachment. The plank-owners are being selected today. And, the next article discusses what life aboard DDG 1000 will be like. 

LIFE AT SEA

Aboard DDG 1000

By Lt. Cmdr. Jay Sego, DDG 1000 Section Head, OPNAV N863 and
Capt. Jim Downey, DDG 1000 Program Manager, PMS 500

While the features of USS *Zumwalt* (DDG 1000)'s internal ship systems mark a revolutionary departure when compared with surface warships of the past, none of the changes have been made without consideration of their impact on the ship's crew. This is not, however, to say that life aboard *Zumwalt* will be just like life aboard any other ship in the Navy. In fact, the Navy's approach to human-systems integration (HSI) in DDG 1000 marks a far-reaching sea change in the way that the human "element" is addressed.

A Day at Sea

A typical day underway starts early for most of the 148 members of the crew and aviation detachment. Just after breakfast, crewmembers receive tasking for their assigned watch station or maintenance team by logging into the Total Ship Computing Environment (TSCE) to view the integrated ship plan (ISP). The ISP is similar to a "plan of the day," but with tasking needed to configure the ship systems, including the Integrated Power System (IPS) and combat systems, for the day's missions. This robust software is a key enabler to facilitate efforts of the crew. The crew is able to update and modify the ISP throughout the course of the day. Additionally, crewmembers carry personal electronic devices to

support internal communications and situational awareness. The crew is ready for watch.

Unlike existing ship classes, the automation on DDG 1000 allows most routine watchstanding to take place in only two locations – the bridge and the two-deck-high ship's mission center (SMC). The SMC will have the look and feel of a command center, with operators overseeing the ship's missions and functions on multi-modal common display system (CDS) workstations. The SMC replaces the cramped combat information centers (CICs) on other U.S. surface warships and gives the commanding officer (CO) and tactical action officer (TAO) an exceptional view of the tactical and operational pictures. This facilitates rapid and informed decisions, and command and control of the ship and assigned assets from one location. Additionally, the SMC replaces engineering control, with the chief engineer overseeing the state-of-the-art IPS alongside the CO and TAO. As a result of shipboard automation features, watchstanders have a more exclusive warfighting role, fewer maintenance assignments, and total ship-system control and responsibility.

After watch, crewmembers will enjoy a much-improved shipboard quality of life. Enlisted Sailors have four-person staterooms with an integrated head and local area

network drops for Internet access. DDG 1000 offers more lounge and recreation space than other surface combatants, including a dedicated fitness facility. Further, the ship offers a crew-training facility and a learning multimedia resource center (LMRC). Crewmembers are individually responsible for personal services such as laundry, routine cleaning assignments, and meals and bussing. Conversely, a significant portion of deep cleaning and facilities maintenance is performed by shore support personnel. DDG 1000 allows Sailors to use the most advanced equipment and automation in the fleet and – at the end of watch – to enjoy the benefits of a ship designed to optimize quality of life, which contributes significantly to operational readiness.

Crew Manning & Training

An early design goal was for the crew size of a DDG 1000-class destroyer to be less than half that of a DDG 51-class destroyer – no easy feat considering DDG 1000 is more than 60 percent larger by displacement. To accomplish this, the Navy undertook an extraordinary effort to incorporate, up front, HSI. The Navy made the human element co-equal with hardware and software in design considerations to engineer enough automation to support a smaller crew. This required

a comprehensive understanding of the ship and systems capabilities enabling the crew to execute tasks for all facets of operations.

For more than ten years, the crew design effort involved various fleet stakeholders and Navy technical teams focused determining which tasks each crewmember should perform and the time necessary to do the task, down to six-minute increments. The result of this top-down, functional-analysis effort was a comprehensive database of more than 25,000 tasks that supports a detailed view for crew/billet workload distribution. Starting from “zero-manning,” the DDG 1000 operationally manned crew concept was supported by a meticulous design process that developed the crew one billet at a time by accounting for tasks from the simplest, such as taking out trash, to the some of the most complex, including weapons release. Crew design analysis in conjunction with ship design produced a three-section underway watchbill, with 19 personnel per section, to meet the design reference-mission: 120-day underway scenarios, equivalent to

wartime operations. Crew manning is at 120 personnel – 16 officers and 104 enlisted. When the ship deploys, the crew will be augmented by a 28-person aviation detachment, bringing the total to 148 personnel.

Like all Navy ships, DDG 1000’s crew will be busy. The workload has been modeled extensively for each crewmember to ensure that all shipboard tasks can be completed without any crewmember exceeding the Navy standard 70-hour work week. That formulation doesn’t include training, however, and all crewmembers need to be well trained in the critical skills required to operate equipment, qualify in individual watchstations, and perform required maintenance tasks. Each new crewmember will attend Navy training schools for Navy enlisted classifications or Navy officer billet classifications, and fleet-level schools such as firefighting and anti-terrorism/force protection courses. Additionally, the Navy is developing more than 1,800 instruction-hours worth of curriculum to provide focused training on DDG 1000-specific watchstanding duties, operational requirements,

and maintenance tasks. Through the training process enroute to the ship, each prospective crewmember will have access to civilian and military subject matter experts to help guide them through the required training, exams, and oral boards. Upon completion of training, each crewmember will report to the ship “ready for qualification.” With minimal under-instruction time, each crewmember will need to demonstrate they are able to successfully perform all required tasks and skills associated with their billet. Only then will they receive a final qualification from the CO.

Crew screening and billeting for DDG 1000 has commenced. The electrical propulsion officer (EPO) and systems test officer (STO) have already reported aboard. Additional slating for the first of the *Zumwalt* class will occur from 2012 to 2015.

Stand by as one of the Navy’s future surface warships comes to life!



▼ The ship’s mission center and common display system workstations aboard USS *Zumwalt* (DDG 1000). (Raytheon)



PARTNERS

Navy and Missile Defense Agency Team Up

IN THE FIGHT

By Lt. Cmdr. Jason Stepp, Afloat BMD, OPNAV N86

One can't help but be impressed by the leading-edge technology and world-class partnership the Navy / Missile Defense Agency (MDA) team is bringing to the fleet. Our Navy is fully committed to providing greater Ballistic Missile Defense (BMD) capability and capacity to the fleet and is working hand-in-hand with MDA in their role as material developer for our nation's missile defense systems.



◀ Japan Maritime Self-Defense Force destroyer JS **Kirishima** (DD 174), successfully launches an Standard Missile-3 Block 1A missile and intercepts a ballistic-missile target from the Pacific Missile Range Facility at Barking Sands, Kauai, Hawaii. The test was conducted as a Japanese and U.S. bilateral exercise, with USS **Lake Erie** (CG 70) and USS **Russell** (DDG 59) providing detection- and tracking-cooperation. (U.S. Navy photo)

Aegis BMD-equipped ships deliver critical mission services to the United States and combatant commanders (COCOMs) around the globe. These ships provide crucial data in support of homeland defense by conducting the Long-Range Surveillance and Tracking mission and providing radar track data on threat ballistic missiles to the Ground-based Mid-course Defense (GMD) interceptor fields at Fort Greely, Alaska, and Vandenberg Air Force Base, Calif., and other elements of Strategic Command's BMD System. Additionally, forward deployed BMD-equipped Aegis ships are providing "hit-to-kill" engagement capability against short- and medium-range ballistic missiles within their operating theaters. This includes exo-atmospheric (or midcourse) defense employing the Standard Missile-3 interceptor,

as well as endo-atmospheric (or terminal) defense using the Standard Missile-2 Block IV missile.

The speeds across all phases of a ballistic missile's flight are tremendous, in some cases exceeding Mach 10. This makes physical or "skin-to-skin" intercept with a Standard Missile (SM) challenging from a technical standpoint—in space or in the atmosphere. That said, Navy and MDA have achieved a remarkable 21 of 26 "hits" or 81 percent success rate overall during operational testing.

The authorization to restart the DDG 51 **Arleigh Burke**-class destroyer line will allow delivery of ships built from the keel up with BMD capability. The first of these more-capable Flight IIA ships (DDG 113) will arrive in 2015. All new-construction Aegis ships and follow-on classes of major surface combatants will be built with BMD capability. This

includes the proposed DDG Flight III with the Air and Missile Defense Radar (AMDR) now under development.

Additionally, adding BMD capability to existing ships is a core part of the Aegis Modernization program. Our Navy has worked closely with MDA to back-fit BMD into the fleet and by the end of this year will have 23 BMD-capable ships, with more on the way. Given the rapidly evolving threat, we are working to ensure nearly all Aegis ships acquire BMD capability. Planned BMD capability will further refine our ability to conduct the BMD mission in-stride with other mission areas, such as AAW and ASW. This additional capacity and capability will be critical in filling COCOMs' requirements for BMD-capable ships.

Other innovations in Navy's BMD program include continued spiral development of the Maritime Integrated

USS **Hopper** (DDG 70) launches a Standard Missile-3 Block 1A during exercise *Stellar Avenger*, successfully intercepting a sub-scale short-range ballistic missile launched from the Pacific Missile Range Facility, Barking Sands, Kauai. (U.S. Navy photo)



Air and Missile Defense Planning System (MIPS). This is a revolutionary graphical planning system that allows planners to wargame multiple ship and land-based asset stationing courses-of-action to validate operational plans at the numbered fleet and theater level. In other words, it will help determine the best location for our ships to defeat a specific BMD threat. Our Fleet Maritime Operations Centers are operating the current version and are slated to receive more capable systems in the near future. Given the great geographic expanses of the threat and responses, this system is critical to avoiding seams in defense and ensuring overlapping command and control of cross-theater BMD coordination and engagement.

During the coming years, the ballistic-missile threats to the U.S. homeland, military forces deployed around the globe, and allies will

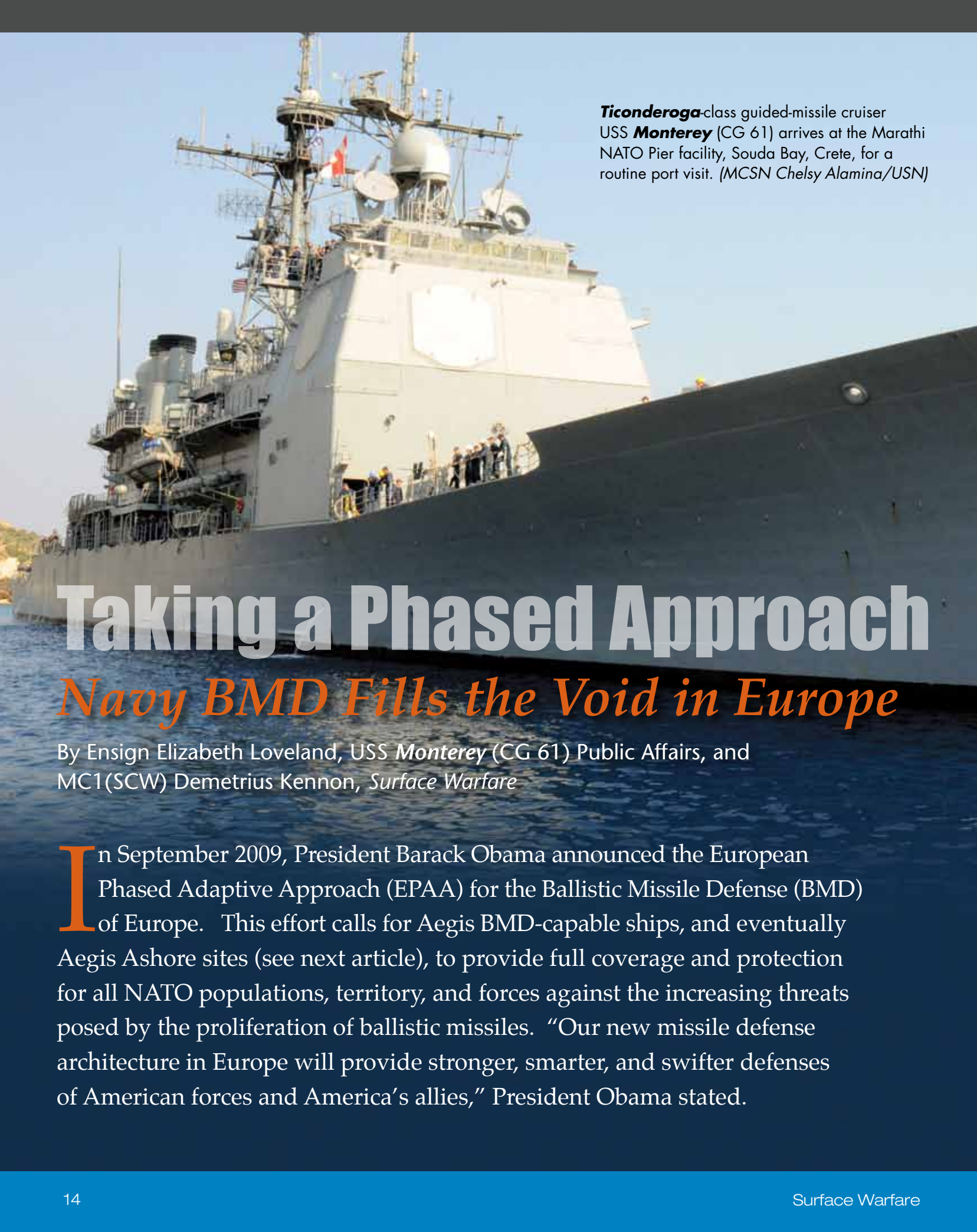
continue to increase. Consequently, the COCOMs are intent on shielding our forces and enhancing regional and national deterrence with Aegis BMD.

In September 2009, President Barack Obama announced that Europe will be defended against ballistic-missile threats by a combination of sea and land-based capabilities (see next article, "Taking the Phased Approach"). In October 2011, Secretary of Defense Leon Panetta announced that four Aegis ships will be forward deployed to Europe and homeported at Rota Naval Base in Spain. In the Pacific, in addition to forward-deployed U.S. ships, Japan's four Kongo-class destroyers have been upgraded with BMD capabilities. No matter the location of the emerging and expanding threat, our Navy / MDA team has a solid program in place today and will deliver even greater capability in the future. 

MDA is developing defenses against all types of ballistic missiles in all phases of flight. In the first portion of a ballistic missile's flight, known as the "boost," "ascent," and "early intercept" phases, the missile gains speed accelerating from a booster to lift its payload.

The next phase, called the "midcourse phase," is the longest part of the missile flight, where the warhead or lethal object separates from the booster in exo-atmospheric space and continues its ballistic trajectory toward a ground target. The midcourse phase typically ends when the ballistic missile and warhead re-enter the Earth's atmosphere. In the final or "terminal phase" of ballistic missile flight, the missile's warhead re-enters the atmosphere and proceeds to its intended target. This is usually the shortest phase of flight and is the last opportunity to engage a threat prior to its impact.

For more information and multimedia on the nation's BMD system, visit the Missile Defense Agency's Web site: <http://www.mda.mil/system>

A large, grey, modern guided-missile cruiser, the USS Monterey (CG 61), is shown from a low angle, sailing on the water. The ship's complex superstructure is visible, featuring various radar masts, antennas, and a large white radar dome. A group of crew members in blue uniforms is standing on the deck near the waterline. The sky is clear and blue.

Ticonderoga-class guided-missile cruiser
USS **Monterey** (CG 61) arrives at the Marathi
NATO Pier facility, Souda Bay, Crete, for a
routine port visit. (MCSN Chelsy Alamina/USN)

Taking a Phased Approach

Navy BMD Fills the Void in Europe

By Ensign Elizabeth Loveland, USS *Monterey* (CG 61) Public Affairs, and
MC1(SCW) Demetrius Kennon, *Surface Warfare*

In September 2009, President Barack Obama announced the European Phased Adaptive Approach (EPAA) for the Ballistic Missile Defense (BMD) of Europe. This effort calls for Aegis BMD-capable ships, and eventually Aegis Ashore sites (see next article), to provide full coverage and protection for all NATO populations, territory, and forces against the increasing threats posed by the proliferation of ballistic missiles. “Our new missile defense architecture in Europe will provide stronger, smarter, and swifter defenses of American forces and America’s allies,” President Obama stated.



▲ Lt. Mary Lowell stands an under-instruction watch as tactical action officer in the combat information center aboard USS **Monterey** (CG 61) during operations in the U.S. 6th Fleet area of responsibility. (MC2(SW) Daniel Viramontes/USN)

PAA Down Range

Initially, BMD in Europe will rely upon the Navy's sea-based Aegis BMD system. As the name implies, the Phased Adaptive Approach allows the U.S. and its NATO partners to develop maritime and non-maritime BMD capabilities in four phases:

Phase 1: One or more Aegis BMD-capable ships deployed in the region carrying Standard Missile (SM)-3 Block 1A interceptors and one land-based AN/TPY-2 radar deployed in Turkey. In addition, U.S. command and control nodes in Europe will come online. USS *Monterey's* (CG 61) 2011 deployment and subsequent Aegis BMD deployers support the first requirements of Phase 1.

In October, Secretary of Defense Leon Panetta and then-Prime Minister José Zapatero of Spain announced the stationing of four BMD-equipped Aegis ships at Rota Naval Base to enhance the security of the European region and the Mediterranean. Stationing these naval assets in Spain places them in a position to maximize their operational flexibility for missions in the Atlantic and Mediterranean.

Phase 2: The addition of an Aegis Ashore site in Deveselu, Romania. Aegis Ashore takes the weapon system components required to support Aegis BMD and adds associated facilities to support operations ashore. This expands defense-in-depth and provides a fixed site on land with the inherent characteristics of sea-based Aegis BMD for the protection of Europe by 2015.

Another key component of Phase 2 is a set of improvements to the Aegis weapon system, which provide enhanced capabilities against short- and medium-range ballistic missile threats. The Aegis BMD 4.0.1 program includes the addition of the Ballistic

Missile Signal Processor, which greatly improves the AN/SPY-1 radar's ability to discriminate objects in space, resulting in more precise target information. Additionally, the SM-3 Block 1B will add an improved seeker. These two advancements, along with others, will help ensure Aegis BMD continues to keep up with the threat.

Phase 3: The addition of the SM-3 Block IIA missile and a second Aegis Ashore site in Poland is scheduled to come on line in 2018. The improved SM-3 Block IIA missile interceptor is under cooperative development by the United States and Japan. This upgrade greatly increases the range and velocity of the missile, providing additional firepower, performance, and operational flexibility against complex threats, including intermediate-range ballistic missiles. The second Aegis Ashore site, upgraded to launch the SM-3 Block IIA, will also provide greater coverage of Europe, which when coupled with Aegis combatants afloat, will expand BMD operational coverage.

Phase 4: With a target date of 2020, Phase 4 is contingent on the fielding of the SM-3 Block IIB missile to enhance the ability to counter medium and intermediate-range missiles and potential Inter-Continental Ballistic Missile threats to the United States from the Middle East.

Monterey in Action

As the proven BMD assets available to theater commanders, Aegis BMD ships carrying SM-3 Block 1A interceptors are a mission-ready force deployable to the Mediterranean and other critical world regions. Aegis has been at sea in U.S. warships since 1983 and has been proven effective in numerous fleet exercises. These multi-mission ships are quickly deployable and can adapt to various mission requirements of the theater commander in

addition to BMD. *Monterey* made history during her 2011 deployment, becoming part of the first phase of missile defense in Europe. "*Monterey's* assignment, as the 'down payment' of the United States' BMD commitment to Europe, is an honor," said Lt. Thomas Cavanagh, *Monterey* systems test officer and BMD officer.

During her 2011 multi-national Composite Training Unit Exercise with USS *George H. W. Bush* (CVN 77), *Monterey* obtained valuable joint operational experience with a European partner and a realistic glimpse into how other European countries might contribute to the BMD mission. The Spanish frigate, ESPS *Almirante Juan De Borbon* (F 102), equipped with Aegis and the SPY-1F radar, supported the strike group by providing area air defense while *Monterey* conducted a BMD mission.

The EPAA allows the Navy to apply its BMD experiences from other theaters to the European continent in support of the President's objectives. Improvements to the SM-3 missile, as well as installation of Aegis Ashore sites in Romania and Poland and radar facilities in Turkey, allow the incorporation of improved capabilities and capacity to respond to evolving threats.



"We have had the opportunity to go to places not normally visited by the U.S. Navy on a regular basis, such as Antwerp, Belgium, and Constanta, Romania, where we were able to demonstrate not only our BMD capability but also the true multi-mission capability of our ship," said Lt. Cavanagh. "Additionally, our NATO partners are learning ways they can contribute to the EPAA as this new mission area evolves."

One of the principal duties *Monterey* performed as the first EPAA ship was an evaluation and assessment of the operating environment for sustained BMD operations in the Mediterranean and

Black Seas. *Monterey* also visited many countries to demonstrate the United States' commitment to EPAA as well as to emphasize her multi-mission capabilities to NATO partners. *Monterey* gained invaluable information about BMD operations in Europe, studied logistics support unique to BMD throughout the region, and validated command and control architectures in support of the BMD mission. All of this was achieved while simultaneously conducting multi-mission operations, and frequent exercises and interactions with allied navies.

Additionally, *Monterey* demonstrated that a well-groomed combat system and a trained and qualified crew are essential to mission success. This process starts almost a year before the ship deploys with schoolhouse and scenario-based training to keep tactical watchstanders and technicians in top shape. "The crew of *Monterey* trained and performed flawlessly throughout our pre-deployment training cycle, and their dedication paid dividends throughout this deployment," said Lt. Cavanagh.

"One of the most rewarding parts of the deployment was watching junior Sailors demonstrate and discuss their role in the execution of BMD and how their maintenance of combat systems allows us to perform it," said Capt. Jim Kilby, commanding officer, USS *Monterey* (CG 61).

Global trends indicate that ballistic missile systems are becoming more flexible, mobile, survivable, reliable, and accurate, while also increasing in range. As the threat to U.S. allies, partners, and deployed military forces continues to grow, Aegis BMD will continue to evolve and ensure the Navy is ready to act when needed.  

Moving Aegis Ashore

By Lt. Cmdr. Hal Vasquez, Aegis Ashore Programs, OPNAV N869

The eyes, brains, and brawn of a Navy Ballistic Missile Defense (BMD) ship are its Aegis weapon system. When the Navy begins construction on DDG 113 next year, its Aegis suite of radars, launchers, missiles, and associated equipment will be duplicated and installed at a military facility in Europe. The creation of this facility will provide BMD under a new program called Aegis Ashore (AA). AA is part of the European Phased Adaptive Approach (EPAA) mandated by President Obama in September 2009 (see previous article). Executing a four-phase plan, the EPAA will employ afloat and land-based BMD-capable assets to defend the American and European people and forces against the increasing threats posed by the proliferation of ballistic missiles.

Phase II, which stands up AA, is scheduled for initial operational capability in late 2015. This first AA facility will be located in Romania, and the second will be built in Poland in 2018 as part of Phase III. Once Aegis comes ashore it will be part of BMD systems already established, incorporating a global network of sensors operated across military

branches, and providing a layered defense to detect, track, and destroy hostile ballistic missiles.


The Navy is developing AA in partnership with the Missile Defense Agency (MDA). MDA is leading the research, development, testing, and acquisition of AA, after which the Navy will assume ownership. MDA began constructing an AA facility at the Pacific Missile Range Facility (PMRF) in Hawaii in August 2011. This prototype will act as a test and evaluation center for verifying requirements and validating design capability. The PMRF range is scheduled to conduct its first test firing in the spring of 2014.

The command and control construct of AA will be similar to a Navy base. An AA Missile Defense System Complex (AAMDSC) will command all AA operational functions and reside on the AA Missile Defense Facility, which will host and provide logistics support for AA.

The AAMDSC will operate similar to the Combat Information Center (CIC) on a Navy ship, with a Tactical Action Officer (TAO) as the senior

officer running the watch team. As on a ship, the AA watchteams will provide a continuous BMD guard, and the number of Sailors on watch will vary depending on the current threat. Because AA will act only in a BMD capacity, the other CIC Air Warfare watchstations (Anti-Air Warfare Coordinator, Air Intercept Controller, Identification Supervisor, etc.) will not be established. Nonetheless, a Sailor standing a BMD watch on a ship will find only minimal differences at the AA facilities. On the theater level, AA will in essence be equivalent to a BMD ship in the European Command area of responsibility providing BMD coverage.

Commenting on the opportunity of serving at an AA facility, FCC(SW) Roberto Gutierrez of USS Decatur (DDG 73) said, "Aegis Ashore seems like an excellent opportunity for motivated Sailors who want to continue to expand their operational skills but still enjoy the benefits of shore duty."

Whether afloat or ashore, professional Sailors will be at the forefront of the nation's and allies' BMD defense in the years to come. 

➤ Computer rendering of an Aegis Ashore deckhouse. Part of a four-phased plan, European Phased Adaptive Approach defends American and European assets against the increasing ballistic missile threats. (Lockheed Martin)"



Aegis Training and Readiness Center

Preparing the Ballistic Missile Defense Team

“Making good decisions is a crucial skill at any level”

—Peter Drucker, Harvard Business Review

It is an image familiar to anyone who has seen a naval war movie. Sailors hover over radar screens. The ship’s commanding officer surveys the action, intermittently calls out to verify information, and receives quick and proper responses from the crew. These are also the images one can expect to see on a deployed guided-missile cruiser or destroyer as the command hones its skills through training.

But on-the-job training in the middle of a deployment can be difficult to come by. The ability of a crew to work as a team under combat conditions demands experience, as does the ability of a strike group to work interdependently. Keeping pace with the speed of innovation as cruisers and destroyers modernize also poses a challenge. So where does the fleet get the training and experience—particularly in fleet Anti-Air Warfare and increasingly Ballistic Missile Defense (BMD)—it needs *before* it sets out to sea?

Only one place: the Aegis Training and Readiness Center (ATRC). ATRC is headquartered at the Rear Admiral Wayne E. Meyer Aegis Education

Center, a tenant command of Naval Support Activity South Potomac (NSASP) in Dahlgren, Va. Widely heralded as the “Father of Aegis,” Admiral Meyer was instrumental in standing up the ATRC in 1984, to train all levels of Aegis combat and weapons systems students, from Sailors reporting to their first ships to prospective commanding officers (PCOs).

“They have the capability, with multiple labs here, to simulate almost any weapons system in the Navy,” said Lt. Cmdr. Don Curran, combat systems officer aboard USS *Paul Hamilton* (DDG 60), and participating in a ten-day joint forces global ground-defense exercise at ATRC with six shipmates. “They also have the subject matter experts for every one of these systems in house. If you have questions or you need to see a display or a scenario based on a different system, ship class, or any one of the modifications, they can do that here,” he said. This includes the capability to train on the different Aegis baselines installed on different ships.

Using all their resources to provide quality training to the fleet, the school

touts a unique 24-hours-a-day, 5-days-a-week work schedule. According to Cmdr. Richard Rossetti, ATRC executive officer, the primary reason for the 24/5 training day is lab-usage requirements for the classes. Much of the maintenance training and tactical training occurs in the same labs and in most cases cannot be conducted simultaneously. The maintenance guys need to “break” the system in order to do their training, but the system must be fully operational to do tactical training. Tactical training is typically conducted during the day, whereas maintenance training is scheduled for the evening, midnight, and early-morning shifts. When conducting tactical training, ATRC instructors have the flexibility to link labs together to support integrated training, or to support other requirements and exercises as long as they don’t impact the primary training mission.

In addition to providing the students with integrated, hands-on tactical training, instructors are also able to use the extended hours to test schoolhouse equipment for regular upgrades, ensuring the fleet is provided with the latest technology. “The last thing we want to do is have a Sailor show up on a ship and say ‘I have no idea what that is,’” said Lt. Paul Wood, instructor and BMD course supervisor, officer training division. “The equipment to do the

training has got to be in place before the system goes out to the fleet.”

Most upgrades are no more than a software update for the equipment. However, the school keeps an eye on future developments requiring completely new installs. “We have to have a plan in place to get the equipment to train the technicians and operators here in the school house,” said Lt. Mike Laich, SPY/Fire Control Systems Radar division officer, enlisted training division. “That way they can get the experience on their system before they actually get to the fleet.”

The school tailors the courses to meet the specific needs of the students. Enlisted Sailors in the fire controlman rating can expect to train on repair, operation, and maintenance of weapons and combat systems. A Combat Systems Maintenance Managers (CSMM) course prepares senior enlisted Sailors and systems test officers. During the seven-week Combat Systems Officer (CSO) course, department heads and division officers headed to Aegis ships, whether chief engineers, combat systems officers, or operations officers, are trained on the fundamentals of the Aegis combat systems. Instruction is tailored to the specific Aegis baseline that the officers will be using aboard their ships and includes both the physical equipment description as well as system operations in multiple simulated Combat Information Center scenarios. Officers going to a BMD-capable ship can expect to spend an extra two weeks in training learning the additional requirements and actions of their systems.



No matter the course, training is not complete without a chance for the students to put what they learned to the test. “What we try to do, as much as possible, is mix all of the students together when they get to the tactical

scenario portion,” said Lt. Wood. This offers a unique challenge to the instructors as they provide leadership and guidance to all levels of students. Even the PCO course, a four-week refresher course offered to PCOs and prospective executive officers, challenges students and instructors to answer difficult questions, such as “how do I make sure I’m supporting the overall function of the fleet instead of just making sure that my ship is defending itself?”

“Senior-level students have a very different mindset than junior Sailors when they come here,” said Lt. Wood. “When they do the scenarios, their focus is much more on performing the mission the fleet expects them to do.”

At the other end of the spectrum, junior enlisted Sailors might get their first feel for a shipboard environment at the schoolhouse. Many come as part of their initial training pipeline before reporting to their first ships. The instructors take care to pave the way for the Sailors to have successful tours.

“The chain of command here is very helpful,” said Fire Controlman 3rd Class Petty Officer Jesse Perryman, a student with orders to USS *Philippine Sea* (CG 58) in Mayport, Fla. “They have a lot of good experience to draw upon and prepare us for what’s ahead. They are there for you non-stop and I appreciated that.”

Aegis is the shield of the fleet, and ATRC ensures Sailors keep the shield strong.  

Royal Saudi Navy CNO visits Dahlgren

By Kimberly Lansdale, Center for Surface Combat Systems

Royal Saudi Naval Forces Chief of Naval Operations Vice Adm. Dakheel Al-Wagdani, in October visited the training commands on board Naval Support Activity South Potomac (NSASP), in Dahlgren, Va., for ideas on upgrading and expanding the Royal Saudi Navy.

“As he and his staff lay the groundwork for a possible expansion of the Royal Saudi Navy, it is critical for them to understand the complexities of bringing a new class of ship on-line,” said Aegis Training and Readiness Center commanding officer, Capt. Ian Hall. “This expansion effort would not only benefit Saudi Arabia in defense of their kingdom, but would increase the capability and capacity of our maritime partners in the Middle Eastern theater of operations.”

According to Center for Surface Combat Systems (CSCS) Commanding Officer Capt. Bob Kerno, the U.S. Navy’s strategy is to promote and increase cooperation and interoperability with our most capable partners on the high-end of naval power. The Navy will also continue to bring maritime nations together to enable common understanding of capabilities and tactics in the global maritime domain.

The CSCS Security Assistance and International Programs directorate coordinates international training at the command. “Our mission is to provide allied forces quality training to enable them to develop ready teams capable of operations that maintain and expertly employ surface combatants,” explained John Hess, deputy director, CSCS International Programs. “We partner with U.S. training, readiness, and policy organizations, as well as other government agencies and industry to support our international mission.”

Testing the Limits of Aegis BMD

Paul Hamilton Helps Chart the Course

By Lt. Elizabeth Scheimer, Fire Control Officer/Ballistic Missile Defense Officer, USS *Paul Hamilton* (DDG 60)

Amid global economic turmoil, a series of poor local harvests and a failing economy heat a long-simmering political situation to the boiling point. The region teeters on the verge of war. Intelligence reveals unusual preparation at several ballistic-missile launch facilities. USS *Paul Hamilton* (DDG 60), USS *John Paul Jones* (DDG 53), and USS *Milius* (DDG 69) are on station in designated Ballistic Missile Defense (BMD) operating areas, poised to fire interceptors or pass threat track information to down-range shooters for ballistic missiles threatening Alaska and Hawaii.

Paul Hamilton's SPY radar detects a new track originating from a threat launch area. The track goes ballistic. It meets doctrine parameters and the tactical action officer orders an engagement. A Standard Missile (SM)-3 interceptor is launched. Moments later, *Milius* gains the track of an intermediate-range ballistic missile headed toward U.S. territory.

In less than an hour, two ships expend all their interceptors, and the third steams at best speed for rapid re-tasking. A voice calls out "stop the problem; stop the clock." The watchstanders climb out of their seats

for a break before the next fight – halfway around the world and with different conditions and threats.

This scenario captures the experience of BMD watch teams from *Paul Hamilton*, *John Paul Jones*, and *Milius* during a September 2011 BMD Exercise (BMDEX) executed by Tactical Training Group Pacific (TTGP). BMDEX 11-06 included 12 scenarios during three days across the 5th Fleet, 6th Fleet, and 7th Fleet areas of responsibility (AORs).

One of the participating ships has spent nearly a decade learning the intricacies of BMD. Pearl Harbor-based *Paul Hamilton* was part of the first group of DDGs outfitted with BMD capability in 2004. The ship has played an important role in the development of this crucial mission area, proving the initial capability of the SPY radar to successfully track ballistic missiles and transmit trajectory data to ground-based command and control (C2) and fire control systems in 2004. In *Pacific Blitz* 2008, she executed the first successful fleet firing of the SM-3 missile, against a ballistic missile target fired from

Pacific Missile Range Facility (PMRF) in Barking Sands, Kauai, Hawaii. Operating with USS *Hopper* (DDG 70), *Paul Hamilton* achieved a direct hit and successful intercept above an open ocean area northwest of Kauai.

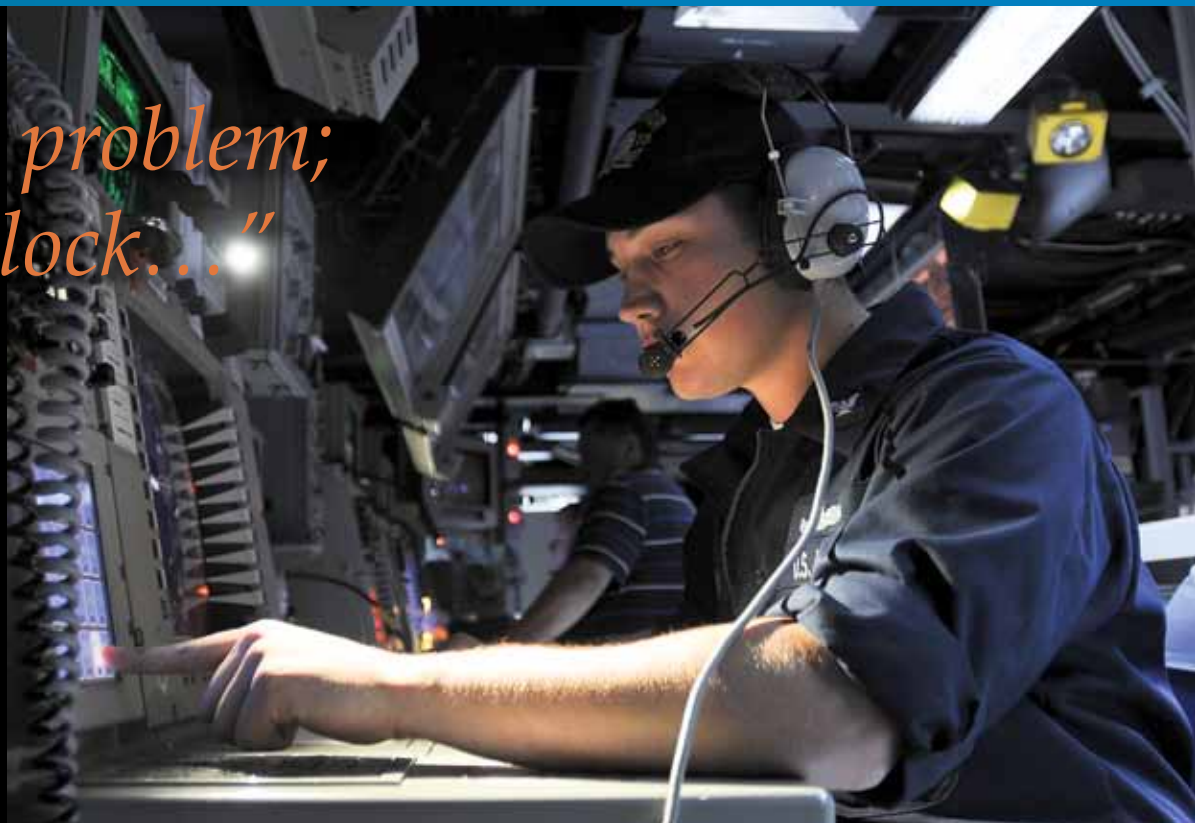
Aegis BMD is the crucial sea-based component of the national BMD system and the first component acquired and operated by our foreign military allies in Japan and South Korea. In addition to her U.S. Navy test and evaluation role, *Paul Hamilton* has played a vital role in building the capacity of our coalition partners through her participation in two intercept tests with the Japanese Maritime Self-Defense Force (JMSDF), also off the coast of Kauai.

Sailors today are part of both the operation and development of BMD. They not only play a crucial role in testing, but are also required to be experts in BMD operations across all theaters and mission sets including homeland defense, regional engagement, and cueing of other BMD system elements. To prepare for these diverse responsibilities, crews go through a



“Start the problem; start the clock...”

◀ **USS *Paul Hamilton*** (DDG 60) launches a Standard Missile-3 to intercept a ballistic-missile target over an open ocean area northwest of Kauai, Hawaii. (U.S. Navy photo)



demanding training and sustainment cycle. To develop as warfighters and maintain their proficiency, teams are required to complete several BMDEXs each year, distributed by a Tactical Training Group.

“The BMDEX scenarios leverage both Navy and Joint synthetic models to provide realistic presentations that not only stress the watchteams in tactics, techniques, and procedures with a BMD focus, but do so in a multi-mission environment designed to provide a realistic approach to high-end warfare,” said Cmdr. Jeffrey Menne, *Paul Hamilton*’s TTGP Air Defense/BMD head. During BMDEX 11-06, trainers presented a robust menu of realistic missions, including homeland defense, cued engagement, regional engagement, and long-range surveillance and track in defense of the United States and its allies. The BMD missions were conducted in simulated multi-threat environments, testing the systems and Sailors to their limits.

According to Lt. Cmdr. Don Curran, *Paul Hamilton* Combat Systems Officer, “The simulations were highly

realistic, and the improvements in mission presentation since our last BMDEX in 2010 have been remarkable. TTGP does great work preparing the ships for real BMD operations.” Because the ballistic-missile threat is prolific and BMD-operations are conducted across multiple theaters, BMD ships often have atypical operational cycles that take them right up to the limits of the CNO’s guidelines for underway time. The varying geographic and operational demands of the BMD mission are parts of the reason that BMDEXs are so important.

During BMDEX 11-06, ships were given the opportunity to exercise their planning and C2 skills by serving as BMD Commander (BMDC) and providing plans and direction to the other units. *Paul Hamilton* functioned as BMDC for 7th Fleet scenarios, building a concept of operations (CONOPS) for presentation to the 3rd Fleet staff. The chance to develop this capability is one of the highlights of BMDEX for ships, giving them realistic practice for duties they will be

▲ FC3(SW) Tyler Wyman operates a radar system control console aboard USS ***Decatur*** (DDG 73) during a pierside BMD exercise in San Diego. (MC2(SW) Phillip Pavlovich/USN)

expected to perform on deployment. During a deployment in early 2011, *Paul Hamilton* was assigned as 5th Fleet BMDC for 11 weeks, producing a CONOPS, participating in exercises, and implementing BMD training among other units in the AOR that directly correlated to skills learned during previous BMDEXs.

BMD is one of the most exciting and important mission areas in the U.S. Navy today; it’s on the forefront of technical development and national strategy. The skills *Paul Hamilton* Sailors worked to perfect in BMDEX contribute directly to the security and protection from hostile ballistic-missile attacks. The ballistic-missile threat is real, and *Paul Hamilton* Sailors remain on the cutting edge of BMD.





NECC Pushes into the Future

By MCC (SW/AW) Kristen Loeding, Navy Expeditionary Combat Command Public Affairs

with Tailored Force Plans

Expeditionary forces span the globe, supporting detainee operations in Cuba and Afghanistan, providing humanitarian aid and relief in Japan and Haiti, conducting major combat operations in Iraq and Afghanistan, and providing security and defense along waterways in the Arabian Gulf and Panama Canal. Helping execute these missions are Sailors from Navy Expeditionary Combat Command (NECC), where the forces are adaptable and create highly functional teams to support a myriad of roles and operations.

NECC's inception in January 2006 brought together all of the Navy's expeditionary forces, including the Seabees, Explosive Ordnance Disposal, and Riverines, under one commander. Throughout NECC's first five years, expeditionary Sailors have been deployed to 62 countries and 25 afloat commands to help carry out vital Navy missions and build partnerships with host nations.

One unique way NECC supports the fleet is through Adaptive Force Packages (AFPs). The AFP concept brings NECC headquarters elements

together as a command and control element for NECC forces. The AFP capitalizes on the synergy created by NECC-unique maritime capabilities creating synergy and the ability to task subordinate commands more effectively as needed. In response to a natural disaster or civil unrest, the AFP brings responding NECC assets under one commander for the Joint Task Force (JTF) or fleet commander's tasking. When a JTF or fleet commander identifies the need for the enhanced command and control capabilities an AFP brings,

NECC will assist in establishing the streamlined structure.

"The need for the NECC AFP really came out of the events in Haiti in early 2010," said Capt. Paul McElroy, commodore of Maritime Expeditionary Security Group (MESG) 2. "We had NECC forces in Haiti but they were all working for different people. The AFP is a staff that is going to provide command and control for all those NECC forces."

During the initial stages of establishing the NECC AFP concept, the AFP planning cell reviewed and discussed hundreds of lessons learned from previous humanitarian-assistance missions and other fleet and armed forces missions. Throughout the process they received guidance from NECC Expeditionary Training Group's key staff members trained to use the joint operations planning system.

NECC's efforts and training paid off when Hurricane Irene bore down on North Carolina and Virginia in late August. The AFP team was headed by Capt. McElroy and linked up with Expeditionary Strike Group (ESG) 2, lead for disaster response in the Virginia area, to embark on USS *Wasp* (LHD 1). "My staff deployed aboard *Wasp* for Hurricane Irene to provide assistance," said Capt. McElroy. "Our staffs worked together to coordinate a disaster response plan in the event the hurricane hit; that drill gave us a great opportunity to train and find out how we can [deploy] our forces."

Being deployed on board *Wasp* gave NECC additional logistical capabilities. The Seabee's Sea-Air Detachment would be able to arrive on location within half a day after the hurricane passed instead of two days if they were shore-based.

During the hurricane, some forces of the AFP, including the Underwater Construction Team (UCT), Explosive Ordnance Disposal (EOD), and Maritime Civil Affairs and Security Training (MCAST) detachments, were not on board *Wasp*. Instead, they

were strategically staged ashore at Fort Pickett, Va., outside the Hampton Roads area so that they would be in a better position to provide assistance in Virginia and North Carolina after the hurricane hit. "If we had left them in place they probably wouldn't have been able to assist as well," said Capt. McElroy. "We wanted to get them out of the storm path so we could deploy them afterward as needed."

The cohesive coordination of all responders in this real-time event proved the efficiency of the NECC AFP. "ESG 2 is very supportive," said Capt. McElroy. "ESG 2 understands what we do and wants to support us and work with us again for certifications in the future, like *Bold Alligator* or other exercises."


The AFP isn't the only NECC initiative that's making waves throughout the fleet. Earlier this summer the Navy's Riverine Force conducted its first-ever well-deck operation with the amphibious fleet. With USS *Oak Hill* (LSD 51) anchored in the lower Chesapeake Bay, Riverine boats entered the well deck several times, testing the boats' maneuverability and the crew's ability to safely bring the boats in and work together with the *Oak Hill* crew.

"The well-deck exercise was a proof of concept," said Capt. Christopher Halton, commodore of Riverine Group 1. "It showed us that with a Riverine Patrol Boat and a Riverine Command Boat (RCB) we can embark and disembark from the well deck of a U.S. amphibious ship. That opens up a number of different types of operations that we can do."

"This is not just another asset for the Riverines and their mission, it is as an asset for the Navy and their missions," said Lt. j.g. Alex Lawton, RCB patrol officer for Riverine Squadron (RIVRON) 2. "It's a new tool that the Navy and Marines can send up river and allows the Navy to bring something else to the fight."

Riverines provide the Navy a capability that crosses the warfare spectrum. They are able to scale up from a small unit to a detachment or squadron level deployment, and they are able to support the maritime strategy by working in cooperation with other nations' maritime security. During the past five years, Riverines have worked with the U.S. Marines, the U.S. Coast Guard, Maritime Expeditionary Security Force (MESF), and several partner nations. After seven successful deployments to Iraq, securing the Haditha Dam and patrolling the waterways, the Riverines have been called for operations like *Southern Partnership Station* and exercise *Bold Alligator* 2012.

"*Southern Partnership Station* provides an opportunity for proof of concept regarding the use of Riverines in Counter Illicit Trafficking (CIT) operations," said Lt. Cmdr. Eddie Yandoc, operations officer for RIVRON 3. "The Southern Command area of responsibility is a lot of jungle and river terrain, it's a natural fit for the Riverine force." Not only will the Riverines be able to provide waterway security, they will also build relationships with the host nations they aid and help ensure regional security and stability.

NECC serves as the single functional command for the Navy's expeditionary forces and as central management for the readiness, resources, manning, training, and equipping of those forces. NECC forces also include Maritime Expeditionary Security; Expeditionary Intelligence; Expeditionary Logistics; Maritime Civil Affairs; Security Force Assistance; and Expeditionary Combat Readiness and Expeditionary Training. NECC forces support the maritime strategy's six core capabilities of forward presence, deterrence, sea control, power projection, maritime security, and humanitarian assistance and disaster response. 

GRIFFIN INCOMING

LCS' Modular Design Supports Navy's Near- and Long-Term Needs

By Barbara Mendoza, Public Affairs Officer, OPNAV N861

One of the features that make the Navy's Littoral Combat Ship (LCS) an extremely versatile platform is its modular design. Modularity makes fulfilling any unexpected change in requirements a far easier task than on a hull designed to carry only one set of systems. Such was the case when the U.S. Army recommended the cancellation of the Non-Line of Sight-Launch System (NLOS-LS) Precision Attack Missile.

The Navy planned to use the NLOS-LS Precision Attack Missile as part of the LCS Surface Warfare Mission Package's (SUW MP) Surface-to-Surface Missile Module (SSMM), but will instead use Raytheon's Griffin missile as the Increment-One interim solution meeting the SSMM requirement. "The cancellation of the program resulted in a search for defensive capability of LCS against the small-boat threat," said Lt. Cmdr. Amy Lindahl, LCS mission modules officer, Office of the Chief of Naval Operations (OPNAV), Surface Warfare Division (N86).

Griffin will fill the short-term requirement to defeat the present

small-boat threat while the Navy works a longer-term solution. "In the near future, the Navy will conduct a competition for the Second-Increment solution. The new missile and improved launching system will be fully integrated into the LCS computing environment," said Lt. Cmdr. Lindahl. "This strategy allows us to get the weapon to the fleet on the same timeline that NLOS would have arrived, keeping the package intact. That's the beauty of LCS' modular design."

"The Navy chose Griffin as the Increment-One solution to provide interim capability against the small-boat threat in part because of its size, ability to launch from the SSMM, GPS guidance, and relative ease of integration," said Lt. Cmdr. Lindahl.

With more than 1000 missiles delivered as of the fall 2011, and its use in real-world operations, the Griffin missile has proven to be a mature and effective system. Griffin's small size (43 inches, 33 pounds) allows for minimal integration modifications to the SSMM's design, and the missile has successfully engaged and defeated stationary and moving marine

targets during testing. Griffin has GPS-aided guidance capability that greatly enhances system performance against the small-boat threat. Its 13-pound blast fragmentation warhead provides focused lethality and results in low collateral damage.

Taking advantage of the LCS modular design, Griffin will be integrated relatively easily into the ship. The Navy is minimizing risk through the reuse of existing hardware. In the initial increment, system control will be located at an SUW MP operator console, but will not be integrated with the LCS computing environment. This initial solution provides a near-term capability and leverages existing structure and support systems to counter the small-boat threat until the Navy transitions to the fully integrated extended-range, autonomous missile.

A Fighting Seaframe

Griffin is not LCS' only defense. The LCS seaframe is armed with a 57mm gun, four .50 caliber machine-guns, and a Rolling Airframe Missile (RAM) system (*Freedom* LCS 1 variant) / SeaRAM (*Independence* LCS 2 variant) for aircraft and missile defense.



▲ USS **Fort Worth** (LCS 3) undergoes builder's trials in Lake Michigan, fall 2011. *(Lockheed Martin)*

LCS operates with focused mission packages that deploy manned and unmanned vehicles to execute a variety of missions including littoral anti-submarine warfare (ASW), surface warfare (SUW) and mine countermeasures (MCM). The SUW mission package increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small-craft threats, giving LCS the ability to protect sea lanes and move a force quickly through a choke point or other strategic waterway. With the SUW mission package embarked, LCS has enhanced detection and engagement capability against enemy small craft and other littoral surface threats.

The Rest of the Package

The SUW MP includes other mission-module systems to counter the surface threat. The Aviation Module uses the embarked MH-60R/S helicopter with its Hellfire missile and the MQ-8B Fire Scout Vertical Take-off and Landing Tactical Unmanned Aerial Vehicle (VTUAV) to provide detection, identification, and classification of surface contacts and to engage longer-range threats. The SSMM provides missile coverage for mid-range threats and small boats. The Gun Mission Module includes two high-velocity 30mm cannons and augments the ship's 57mm gun to counter close-in to mid-range threats. Future increments to the SUW mission package include

enhancements such as the increment-two SUW missile that will provide long-range defense, the Maritime Security Module, which supports the embarkation of a visit, board, search, and seizure (VBSS) team to provide a maritime interdiction operations capability for LCS, and the Irregular Warfare Module, which expands the medical and training capability of LCS.

Taken as a whole, the SUW MP provides LCS with a formidable ability to conduct littoral surface warfare. 🏢 🚢

The coming years are predicted to be lean for the U.S. military. Despite an expected downturn in dollars in annual budgets, the U.S. Navy must maintain a global presence to protect sea lanes for commerce, conduct humanitarian missions, respond to crises, and generally safeguard the world's oceans in cooperation with allies and friends.

The Navy intends to sustain its fleet by both acquiring new ships and modernizing and maintaining existing assets. Extending the service lives of the existing fleet is critical to the Navy's ability to carry out vital roles, missions, and tasks worldwide.

U.S. amphibious warships and embarked Marines are routinely

old. The modernization program extends these ships' service lives to 40 years and allows some ships in the class to meet the Navy's mission requirements through 2038.

The LSD 41/49 Mid-life Modernization Program started in 2008 to revitalize and upgrade the LSDs of the *Whidbey Island* and *Harpers Ferry*-classes. The program will see all 12 ships of these classes undergo year-long maintenance periods – known as Extended Docking Phased Maintenance Availabilities (EDPMAs) – to improve their material readiness, replace obsolete with modern equipment, and reduce the costs associated with owning and operating these ships. That last

her modernization at Norfolk, while USS *Fort McHenry* (LSD 43) and USS *Ashland* (LSD 48) are undergoing their mid-life upgrades. USS *Germantown* (LSD 42) was the first ship to finish her upgrade at NASSCO, swapping homeports with the Sasebo, Japan-based USS *Harpers Ferry* (LSD 49), which will then start her West Coast mid-life upgrade in July at NASSCO.

The work involves the installation of new technologies, as well as hull, mechanical, and electrical (HM&E) upgrades. The former includes new systems such as a local area network, a digital machinery control system, machinery diagnostic systems, and an onboard training system. The HM&E upgrades encompass a range of ship

Reinvigorating

called upon to conduct many types of missions in addition to amphibious assault, from anti-piracy patrols in the Indian Ocean to disaster relief in places like Japan (three amphibious dock landing ships, or LSDs, responded to the 2011 earthquake and tsunami tragedy) and Haiti (four LSDs were instrumental in providing disaster response to the 2010 earthquake). Consequently, many of these ships have been worked hard during the past decade, and their overall material readiness levels have declined.

The *Whidbey Island*-class ships are aging. Originally designed to operate for 30 years, the lead ship is 26 years old, and the average age of the entire LSD fleet is 20 years

benefit is important as the Navy grapples with tight budgets.

In July, USS *Rushmore* (LSD 47) completed her mid-life modernization work and conducted very successful sea trials after a 52-week EDPMA at the National Steel and Shipbuilding Company (NASSCO) and Continental Maritime in San Diego.

Of the eight *Whidbey Island*-class amphibious dock landing ships (LSDs), five – including *Rushmore* – have been modernized, while another two are in the yards receiving the upgrade. On the East Coast, USS *Gunston Hall* (LSD 44) was the first ship to enter her EDPMA at Metro Machine in Norfolk, in 2008. Since then, USS *Whidbey Island* (LSD 41) completed

systems, the most significant being the replacement of auxiliary steam boilers and evaporators with all-electric equipment. Substituting electric for steam auxiliaries significantly reduces routine maintenance manpower requirements and removes a major source of corrosion.

Corrosion, in all its manifestations, accounts for nearly 25 percent of the Navy's maintenance spending each year. With this in mind, the modernization effort also entails an additional, ship-wide anti-corrosion scrub that includes tanks, voids, and the well decks from which landing craft are launched.

Fuel efficiency is another focus of the improvements. Each LSD's

The amphibious dock landing ships USS **Pearl Harbor** (LSD 52) and USS **Rushmore** (LSD 47) share a pier with USS **New Orleans** (LPD 18) at Naval Base San Diego. (MCCS(SW) Joe Kane/USN)

the Navy's Amphibious Workhorses

two propellers are being replaced with higher efficiency propellers and painted with an anti-fouling coating developed by the Naval Research Laboratory, a move that will reduce hydrodynamic drag and save fuel. The efficiency of the LSDs' main diesel engines likewise will be enhanced via a propulsion load management system. In other areas, crane controls, air-conditioning units, combat systems, and shipboard protection systems (on three ships) are also being upgraded.

The Navy is paying on average about \$100 million for each ship's modernization. The Navy is using a multi-ship, multi-option contracting approach in which each

ship availability is considered an "option" under a single, potentially multi-option contract. This method allows the shipyard and the Navy to learn lessons from the first ship that can be applied to those that follow. That, in turn, allows the government and industry to save time and money, a vital consideration in an era of tight budgets.

The LSD modernization program will continue until the last ship in the class, USS **Pearl Harbor** (LSD 52), exits NASSCO's yard in 2015. That milestone will mark the end of one key program to keep the Navy and its ships combat-ready – and affordable – in challenging times. 🇺🇸 🇺🇸



EN1 Jerron Laurente, left, talks with ENFN Jennifer Garcia about gauge levels in the engine room of USS **Tortuga** (LSD 46). The LSD engineering plants receive a major overhaul as part of the mid-life upgrades. (MC1(SW) Josh Huebner/USN)

THE WATER-FILLED WIND TUNNEL

SHIP TESTING IN THE LARGE CAVITATION CHANNEL

By Edward Lundquist, Principal Science Writer, MCR Federal

The Navy's William B. Morgan Large Cavitation Channel (LCC) is a unique facility. Located in Memphis, Tenn., on President's Island, it allows naval architects to test ship design variations in a realistic environment with an adjustable velocity that simulates different speeds through the water. Just as wind tunnels are used to test aerodynamic shapes for aircraft and other airborne vehicles, the LCC is an water-filled "wind tunnel" used to test hull shapes, propellers, and appendages such as rudders and sonar domes, allowing engineers and designers to make big decisions regarding small variations.

The facility is named for Dr. Morgan, who, for 22 years before retiring in January 2001, served as head of the Hydrodynamics Directorate at the David Taylor Model Basin, at the Naval Surface Warfare Center, Carderock Division (NSWCCD) in Bethesda, Md.

The LCC is a facility of NSWCCD, and, with its advantage of being the largest water tunnel in the world, complements the David Taylor Model Basin and its world-renowned tow tanks also used for hull testing.

Bob Etter, chief engineer of the project office responsible for design, construction, and initial operation of

the facility, has been with the LCC since its inception in 1991. "The 40-foot long test section is 10 feet by 10 feet in cross section, big enough to mount a 36-foot long model of a DDG 51 hull – weighing five tons fully rigged," Etter said. This and other models are suspended from the test section ceiling. "The LCC is uniquely capable of performing large-scale propulsor evaluation tests – including cavitation – using fully appended models of surface ships, submarines, torpedoes, and unmanned underwater vehicles."

Models used for testing at the LCC may be similar in size to those used in the largest tow tank at Carderock. "But whereas you may be able to get data from a 30 or 40-second run in the tow tank, the LCC allows you to observe and gather data for hours uninterrupted," Etter said.

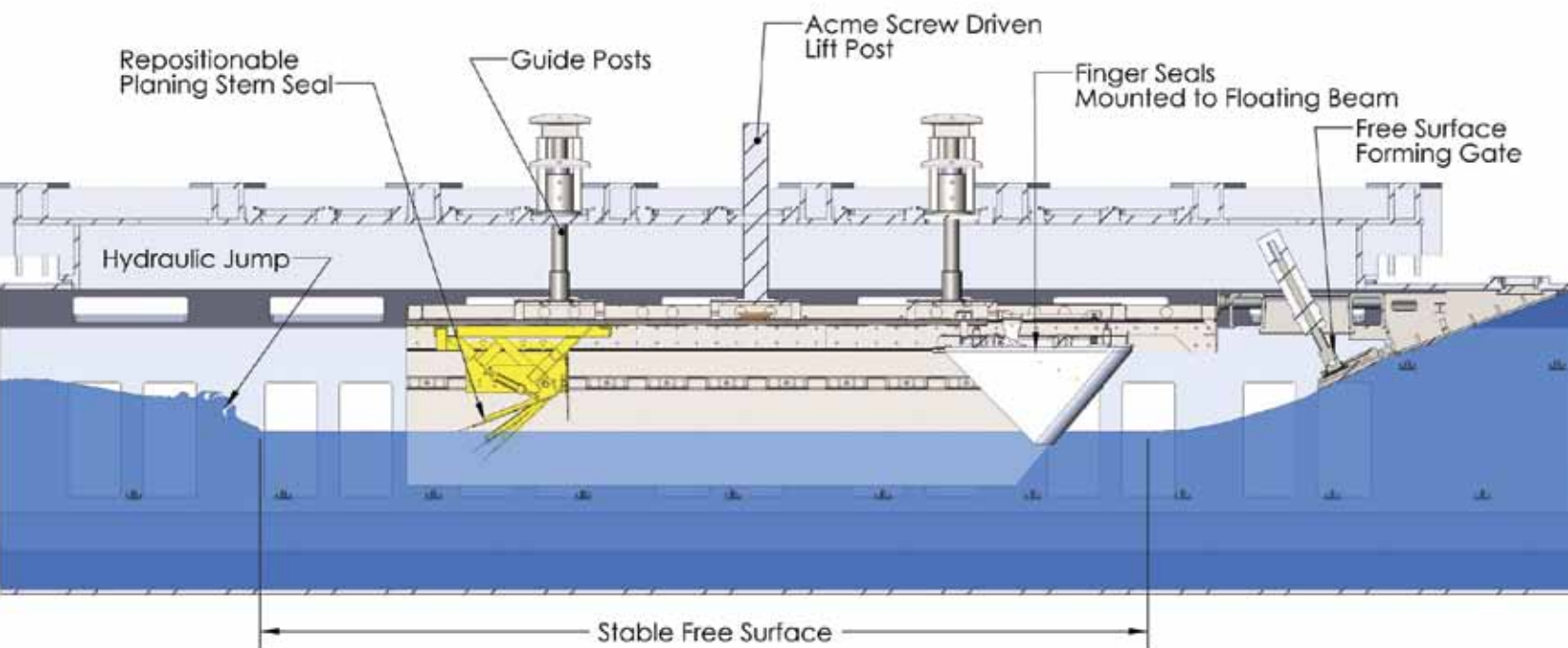
"An advantage of a tunnel over a towing tank is that one can achieve a continuous-running mode which is particularly useful for visual observations," said Dr. Lawrence Doctors, a professor in the School of Mechanical and Manufacturing Engineering at the University of New South Wales in Australia. "This is not possible with a traditional towing tank, in which the run typically lasts less than a minute, followed by a

waiting period of usually 30 minutes before the next run."

LCC's water flow can operate at a velocity up to 35 knots, thanks to a custom-made variable revolutions-per-minute 14,000-horsepower motor. It has a 100-foot long, four-foot diameter shaft that turns an 18-foot diameter axial flow pump. In addition to varying velocity, water pressure can be varied from two to 60 pounds per square inch absolute. "Changing the pressure is important when examining cavitation at different depths and simulating conditions at much higher speeds – up to 100 knots or more," Etter said.

The channel uses fresh water from the municipal water supply – 1.4 million gallons of it. The LCC is usually completely filled with water when testing hull and underwater shapes.

LCC Operations Manager Dave Foster leads the Memphis staff of six full-time civil service employees who operate the LCC during testing and perform maintenance in-between. Foster said that the LCC has unique capabilities for experimentation for the Navy, as well as academic and commercial purposes. The LCC is fitted with viewing windows on the sides, on the corners, and underneath to visually study the flow. It is also designed to conduct acoustic testing



and can be rigged for very silent operation so sensors can collect data.

Recent experiments tested the interaction between surface effect ship (SES) bow seals and moving water surface to create a free surface effect. A team from the University of Michigan (UM) led by Dr. Steven Zalek conducted these tests under the sponsorship of the Office of Naval Research (ONR). These bow seals are used to contain the air within the air cushion under the SES, similar to the fabric skirts on a landing craft air cushion (LCAC). SESs provide more stability in open ocean waters than traditional hovercraft since part of their hulls remains in the water even when the air cushion is in operation.

Kit Ryan of Alion Science and Technology said the recent LCC testing will help naval architects to improve the computer development of SES-type ships. "Deciding how much power to install in a high performance ship like an SES is an important decision, and there is much less existing empirical information in the literature about it than for other types of ships, adding to the risk of not getting it right. These

tests will help the whole community."

Zalek said his team's testing will examine the air cushion free surface and bow seal position, deformation, motion, forces, and local hydrodynamics to help obtain a better understanding of the seal-air cushion-water interface. "We're not trying to model an SES in its entirety, but capture the physics of an SES bow-seal system. The data will be useful in the development of physics-based numerical models."

"The work put up by the University of Michigan team along with the staff at the Large Cavitation Channel facility is simply extraordinary," said Pere-Andreu Ubach de Fuentes, assistant director of the International Center for Numerical Methods in Engineering in Barcelona, Spain, who attended the recent ONR-sponsored demonstration of the LCC SES skirt testing. "It is a remarkable effort, raising the level of understanding of the physical response in the coupled behavior between the SES air cushion, the bow skirts, and the incoming water flow. I am very excited at the prospect of obtaining high-quality experimental results on a problem as complex as this one."

▲ Diagram of the surface effect ship testing conducted at the William B. Morgan Large Cavitation Channel by the Office of Naval Research and University of Michigan. (U.S. Navy photo)

This impression of LCC's capabilities is shared among engineers. "Compared with other facilities, LCC test speeds are higher, making it usable for research into the hydrodynamics of high-speed craft such as surface effect ships," said naval engineer Robert Moore, who works as a consultant for Textron. "Compared with a towing tank, you can run continuously, and the ability to view the test for extended periods of time from above or below the water is extremely valuable."

Ryan is impressed with the size of the LCC. "I haven't seen any other water channel that is even in the same ball park as this one. Certainly there are no others in this country. The sheer size of the test capability and the channel itself dwarfs anything else like it."

For the UM and ONR team, the hope is that the test results will be as impressive as the capabilities of the test facility. 🇺🇸 🇺🇸

THE WAR OF 1812

By Michael Crawford, Senior Historian, Naval History and Heritage Command



“We have met the enemy and they are ours – two ships, two brigs, one schooner, and one sloop.”

– Commodore Oliver Hazard Perry, 1813

“The protection of areas of vital strategic importance are but matters of course if we control the seas. Only naval air-sea power can ensure this.” – Admiral Chester Nimitz, Chief of Naval Operations, 1948.

Debates about naval policy in the United States are perennial. Today, we argue such issues as the Navy’s operational size, number of carriers, number of Sailors, how much of the fleet should be forward-deployed, and where. Two centuries ago our predecessors similarly questioned if we needed ships of the line, the optimal design for our frigates, and what the mix should be between oceangoing warships and gunboats for coastal defense.

Although the same types of naval policy debates raged in the early years

of our republic as today, there was something different about the debate between 1787, when the Constitution was drafted, and June 1812, when the United States declared war against Britain in defense of free trade and Sailors’ rights. The debate was not merely over what kind of navy we should have and how we should use it, but also over whether we should have one at all.

The War of 1812 was important to the U.S. Navy for several reasons. The war demonstrated to the American public the vital importance of an effective naval force for national defense. It validated early policy decisions to implement cutting-edge technology for Navy warships, and it established a heritage of competence, heroism, and victory.

One party, the Federalists, believed the United States to be a commercial people destined to grow industrially and to play a leading role on the international stage. They argued for a strong navy that could at least defend U.S. merchant shipping against threats from all quarters.

The opposing party, the Jeffersonian Republicans, glorified the agriculturalist as the ideal citizen and denigrated commerce and industry as morally corrupting. Ignoring the necessity of keeping the sea lanes open so that the United States could market agricultural surplus abroad, they feared that a navy was a danger on the high seas – where it was likely to embroil the United States in unwanted wars – and domestically as a source of political corruption. Navies, they pointed out, are expensive. To support a strong navy, a government must borrow money from the rich. To pay the interest on those loans, a government must tax the common

people. Thus, having a strong navy meant the rich grew richer while the common man was reduced to poverty and dependence, undermining the rough economic egalitarianism on which a republican form of government rested.

The War of 1812 changed all of that. The experience of war convinced the citizenry that a navy was essential to the defense of our freedoms and to continued national prosperity. Warfare on the northern lakes demonstrated the importance of a navy as an element of national defense. Commodore Oliver Hazard Perry’s naval victory on Lake Erie made possible General William Henry Harrison’s defeat of the British and Indian enemy at the Battle of the Thames, and the twin American victories secured control of the Old Northwest, ending British plans to establish an Indian buffer state between the United States and Canada.

The war made it clear that a successful invasion of Canada would require Americans to first establish naval superiority on Lake Ontario, a pre-condition that the equal shipbuilding race on the lake precluded. Commodore McDonough’s victory over the British squadron on Lake Champlain, by threatening the British army’s supply lines, forced the invading enemy army of 10,000 to retreat back across the border into Canada.

On the other hand, the inability of the small American seagoing force to break the British blockade of our Atlantic coast reduced federal revenue to a trickle, left U.S. agricultural states without an outlet for their produce, and disengaged the merchant fleets of U.S. commercial states.

The timely peace saved the nation from financial and economic collapse.

A photograph of the USS Intrepid (MCMC-1123) in New York Harbor. The ship is a grey-hulled missile cruiser, viewed from the side, with the number '23' visible on its bow. To its left is the USS Constitution, a three-masted sailing ship. In the background, the Washington Monument rises above the New York City skyline. The water is dark blue, and the sky is clear.

shared record of achievement by officer and Sailors that enhanced esprit de corps and pride of service. It also led to the establishment of a professional ethos that shaped the development of the fleet well into the 19th century. Lastly it saw the emergence of a group

In addition to validating a strong Navy, the War of 1812 confirmed the decisions made by naval leaders in the 1790s regarding the types of warships to build. In 1794, Congress authorized the president to create a naval force of six frigates. Rather than purchasing merchant ships and converting them into men-of-war, an option under the act, Secretary of War Henry Knox recommended the construction of new frigates designed to be superior to any vessel of that class in European navies. The American frigates should be at least as big and powerful as any frigates then in existence. Hull construction should be as advanced as the technology of the day would permit. The frigates should be as heavily armed as, or more than, any single opponent they could not out-sail, and their rigging and hull form should give them speed to elude any enemy man-of-war or

The War of 1812 was important to the institutional development of the U.S. Navy in several ways. It created a

When reflecting on the events of the War of 1812, Theodore Roosevelt expressed these sentiments: "The deeds of our Navy [during the War of 1812] form a part of history over which any American can be pardoned for lingering." The two hundredth anniversary of that war presents a valuable opportunity to recount those deeds to the American people.

Learn more at the Naval History and Heritage Command's Web site: www.history.navy.mil.



THIS SAILOR'S IN THE NAVY

This Sailor's Navy: Ensign Alexander Brown

By MC1(SCW) Demetrius Kennon, *Surface Warfare*

▲ Ensign Alexander Brown, Systems Test Officer aboard USS **Paul Hamilton** (DDG 60), during training at Aegis Training and Readiness Center in Dahlgren, Va. (MCCS(SW/AW) Janet Davis/USN)

Fast Facts:

- Hometown: San Diego, Calif.
- Billet: Systems Test Officer, USS **Paul Hamilton** (DDG 60)
- Homeport: Joint Base Pearl Harbor-Hickam
- Service: Enlisted 2000, commissioned 2009
- Favorite Navy Movie: *Men of Honor*
- Favorite Port Call: Melbourne, Australia
- Favorite Mess Decks Meal: Pizza and wings night

As Systems Test Officer (STO) for USS **Paul Hamilton** (DDG 60), Ensign Alexander Brown is the commanding officer's (CO) subject matter expert for the ship's Aegis Ballistic Missile Defense (BMD). "I advise the CO on all things technical and tactical for BMD, and I run the training for BMD," said Ensign Brown. He's also in charge of the Combat System Operational Sequencing System and oversees "configuration management, corrective maintenance, and preventative maintenance of all weapon systems," he said.

Ensign Brown chose to enlist right out of high school, a result of the large naval presence in his hometown of San Diego and the possibilities the Navy offered. "I was looking for a place that would teach me a skill and give me an opportunity," he said.

After boot camp, Ensign Brown attended the Advanced Electronics Technical Core course and Fire Controlman (FC) 'A' school in Great Lakes, Ill. He subsequently attended the Fire Control Systems 'C' school and Aegis Weapon System Technician Track 4 course in Dahlgren, Va., at the Aegis Training and Readiness Center.

Ensign Brown chose the FC Aegis rate "because they are the best of the best," he said. "Some of our most capable ships are Aegis cruisers and Aegis destroyers; why wouldn't I want to be an Aegis fire controlman?"

he said. "I was able to use the most powerful and capable weapon system on the water. Where else can you say you blow things up in space?"

After the Navy gave Ensign Brown initial training as an Aegis FC, his first assignment was USS **Mobile Bay** (CG 53). While on board, he converted from a weapon systems technician into a SPY-1A radar technician. As he gained a broader experience, he earned the position of work center supervisor. It was then that he decided to become a Limited Duty Officer (LDO) and a Systems Test Officer.

"I've always seen STOs as the top of the Aegis world, and that's what I wanted to be," Ensign Brown said. "Mustangs' did it the hard way, moving up through the ranks. The respect given to and commanded by the LDOs and CWOs I saw in my career made me want to join their ranks."

Still an Aegis FC, Ensign Brown reported to the Aegis Technical Representative command in Moorestown, N.J., following his tour aboard **Mobile Bay**. "I served as the leading petty officer (LPO) of radar division," he said. "We did extensive research and development for future versions of the Aegis Weapon System. I was part of the testing for BMD 3.6.1 and 4.0.1," said Ensign Brown, referring to the most recent baseline versions of Aegis' operating software.



After shore duty, Ensign Brown was part of the pre-commissioning crew of USS *Stockdale* (DDG 106), where he served as the combat fire control division LPO. Aboard *Stockdale*, he submitted his LDO package, was selected, and received his commission. He also received advice from *Stockdale* Commanding Officer Cmdr. Fred Kacher about his new position, words that he always remembers: "Mustangs tell the truth, no matter what."

Although Ensign Brown attended Mustang University in Newport, R.I., and Combat Systems Maintenance Manager and BMD Tactical Operations courses in Dahlgren, Va., prior to his commissioning, it is his experiences as an Aegis FC that are the foundations for his position aboard *Paul Hamilton*. "As a prior SPY technician, I give the CO great insight on the status and operation of the


radar," said Ensign Brown. "I'm the CO's right-hand man when it comes to fighting the ship in a BMD theater."

Ensign Brown has led a proactive naval career achieving the things he desired, and he continues to set goals. He plans "to continue to learn and grow as a Sailor, leader, and mentor; and, to keep *Paul Hamilton* 100 percent mission-ready and successful," he said. On a personal level Ensign Brown hopes to return to San Diego for his next duty station, training ships with the Center for Surface Combat Systems.

As a prior-enlisted Sailor, Ensign Brown is able to relate closely and provide more informed feedback to his junior enlisted personnel. As an officer, he has a greater opportunity to lead. "My commission gives me great reach and influence as a mentor for Sailors," he added. "It's in an area

▲ USS *Paul Hamilton* (DDG 60) passes by the Missing Man Formation monument at Joint Base Pearl Harbor-Hickam while returning home from a seven-month deployment. (MC2(SW) Daniel Barker/USN)

where my expertise contributes to the fullest to my ship and the Navy. It has given me the opportunity for unlimited growth."

For more information about the FC Aegis rating, see "Choose Your Rate: Aegis Fire Controlman" in the summer 2011 issue of *Surface Warfare*. To learn more about becoming an LDO, check out the article "The Future for Mustangs is Bright," in our spring 2011 issue. Both articles can be found online at surfwarmag.ahf.nmci.navy.mil/index.html. 

You've Got Orders:

Naval Support Facility Dahlgren

By MCCS(SW/AW) Janet Davis, *Surface Warfare* By MCCS(SW/AW) Janet Davis, *Surface Warfare*

Housing:

370 resident military personnel live in base housing. The Navy and Lincoln Military Housing provide housing for the military in the Dahlgren area in a public-private venture partnership. There are 107 units of single-family houses and 125 townhouse units that serve the needs of the military families stationed here.

Pets are a conditional privilege for residents. Residents must comply with state and local laws governing pet ownership, including licensing and vaccinations laws. The limit is two dogs or cats per household. Birds, fish, hamsters, and guinea pigs are permitted, but exotic animals such as reptiles, rodents (other than hamsters and guinea pigs), ferrets, hedgehogs, or farm animals are prohibited. Housing

reserves the right to restrict certain breeds of dogs considered dangerous.

Schools:

Dahlgren School provides education to students in pre-K through eighth grade. In addition to an extensive standard academic program, the school offers classes in music, art, drama, foreign languages, physical education, health, and advanced math. Dependent children of U.S. and foreign military members residing in on-base Dahlgren family housing and assigned to either Dahlgren or Indian Head are eligible to attend.

Play:

- **Facilities/Activities:**
The NSF Dahlgren Morale, Welfare, and Recreation (MWR)

Department offers a wide range of recreational facilities and activities for Active Duty, Reserve, and retired military, as well as DoD civilian employees, NSASP contractors, and all categories' family members. A wide range of activities are on offer, including outdoor recreation such as whitewater rafting, sports leagues, tournaments, an indoor aquatics center, a fitness center, and the state-of-the-art bowling center Cannonball Lanes.

Great sightseeing daytrip opportunities include visits to Washington, D.C.; Baltimore, Md.; and Richmond, Va. Personnel enjoy professional sports such as Washington Redskins and Baltimore Ravens football, Washington Nationals and Baltimore Orioles baseball, Washington Capitals hockey, Wizards basketball, D.C. United soccer, college sports, and minor league sports such as Richmond Braves and Southern Maryland Blue Crabs baseball. History buffs enjoy colonial and Civil War historical sites and tours in nearby Fredericksburg, Williamsburg, and Richmond.

- **Best Food on Base:**

Gray's Landing on the Potomac Restaurant – formerly the base's general mess – is an MWR-operated restaurant at NSF Dahlgren. The restaurant is open to all base personnel for breakfast, lunch, and dinner. Options include hot entrees, grill items, a made-to-order sandwich deli, an extended salad and soup bar, and desserts. Patrons pay \$7.50 for lunch and dinner, which includes soup, salad, dessert, and a beverage. The restaurant also features a grab-n-go option which offers certain carry-out items at \$6 per person and breakfast for \$5.

▼ Transportation personnel at Naval Support Facility Dahlgren prepare to off-load a World War I-era tractor-mounted artillery piece, the first gun originally test-fired to mark the establishment of Dahlgren as a naval proving ground on Oct. 16, 1918. The 7-inch, .45-caliber gun was restored by the Naval Surface Warfare Center, Dahlgren Division. (Doug Davant/USN)



Overview:

Location:

Central Virginia on the Potomac River, an hour and a half south of Washington, D.C., by car.

Size:

Naval Support Facility (NSF) Dahlgren is geographically divided into the “Mainside” and “Pumpkin Neck” – the latter an Explosive Experimental Area. Mainside is 2,677 acres, while Pumpkin Neck is a 1,641-acre peninsula south of Mainside on the Potomac River.

Mission:

The Navy established Dahlgren in 1918 as an extension of the Indian Head Proving Ground for testing naval guns. Planners chose the site on the Potomac River to test modern, high-powered munitions on a ballistic range. It was named Lower Station, Dahlgren Naval Proving Ground in honor of Rear Adm. John A. Dahlgren. Following World War II, the emphasis shifted from traditional proof and testing functions on weaponry to research and development of weapon systems, functions that continue today.

Commands:

Installation management transferred to Commander, Navy Installation Command in 2003. On Nov. 3, 2005, Dahlgren became NSF Dahlgren with the commissioning of Naval Support Activity South Potomac (NSASP), a sub-command of Naval District Washington, as the installation’s new host command.

Supported commands on board NSF Dahlgren include the Navy Air and Missile Defense Command; the Aegis Ballistic Missile Defense Field Activity; the Aegis Training and Readiness Center; the Center for Surface Combat Systems; the Joint Warfare Analysis Center; Naval Surface Warfare Center, Dahlgren Division; the U.S. Air Force 20th Space Control Squadron, Detachment 1; and the U.S. Air Force 614th Air and Space Operations Center, Detachment 1.

NSF Dahlgren employs more than 7,000 civilians, military personnel, and contractors. Additionally, the Aegis Training and Readiness Center (ATRC) student load is 360 students at a time. Aside from students, typical enlisted ratings found at Dahlgren commands are information systems technicians, intelligence specialists, yeomen, culinary specialists, and logistics specialists.

• Best Food off Base:

“Roma Pizza has great lunch specials, and makes a great pad thai that is only sold twice a week for lunch. It is also the place to be for Sunday football,” said Lt. Alexa Forsythe, a former student at ATRC enroute to Department Head School in Newport, R.I., and a tour as operations officer on USS *Gonzalez* (DDG 66). “The Olympus Deli offers great Greek fare that is fresh and healthy,” she said. “Finally, there is a Thai place right outside the gate, Bangkok Thai Cuisine, which we ate at every Monday night. They have everything from pumpkin to pineapple curries to mango and sticky rice. Meanwhile Rick’s on the River and Tim’s 2 are great local places that are on the water and provide good food and live music.”

Take Note:

• Words of Caution:

- The base is remote. Expect a drive of about 30 to 40 minutes to get to a mall or a movie theater.
- Cell-phone coverage can be spotty and dropped calls are frequent.
- Many recommend setting up a land-line, whether a resident or student.
- Watch the posted speed limit! It slows to 25 mph close to base, and the police are very stringent.
- Don’t use your cellphone while driving on base; you can accumulate “points” and be denied vehicle access to the facility when a threshold is reached.

• Interesting Facts:

- Dahlgren is great for Sailors with families who want to be near the D.C. area and museums without the high cost of living.

- You can register weapons and get a pass to carry firearms and ammunition on base to hunt giant wild turkey and deer.
- There is a marina and a yacht club on base. Kayak rentals are also available.
- According to Lt. Forsythe, Dahlgren is what you make of it. “We had a guy bring up a jet ski and use the marina. We started a weekly hashing [running] club. We took advantage of free bowling on Monday at lunchtime. We used MWR to supply tables, chairs, and coolers for weekly BBQs. The chief’s mess will also let groups use their space for a fee, provided there is a sponsor from the mess at the event. There is even an auto body shop that lets people work on cars for fun.” 

For more information, check out the Naval Support Activity South Potomac Web site: www.cnic.navy.mil/SPotomac

Choose Your Rate:

Cryptologic Technician (CT)

By MC1(SCW) Demetrius Kennon, Surface Warfare

The Job

At their inception, CTs primarily deployed in supporting roles on an ad hoc basis and were not assigned as permanent ship's company. Today, the Navy employs CTs throughout every warfare area and in operations around the globe.

CTs control the flow of messages and information and also conduct Electronic Warfare tasks. Depending on the specific rating branch, they may handle radiotelephone communications and foreign language translation; maintain electronic and electro-mechanical equipment, computer



communication, and all Morse code communications; or, operate radio direction-finding equipment.

In addition to the normal division-level collaterals, the most common command-level collateral duty for

a shipboard CT is the ship's Special Security Officer (SSO) or the SSO's assistant. The SSO manages clearances for all shipboard personnel and visitors to the command. SSOs are also responsible for accreditation of classified spaces and maintaining access lists.

CTs' responsibilities extend further than handling sensitive material. In addition to their rate-specific obligations, CTs can just as easily be found standing watch on the quarterdeck, fighting fires with the fire party, or heaving a line during a replenishment-at-sea.

Fast Facts:

History

- 1917 – The Code and Signal section of the Naval Communications Service undertakes cryptologic duties during World War I.
- 1921 – Navy creates “Radioman” (RM) rating.
- 1935 – Establishment of the Naval Security Group.
- 1942 – Navy creates Specialist Sp(Q)(CR) Cryptographer, Sp(Q)(IN) Radio Intelligence, and Sp(Q)(TE) Technician ratings.
- 1948 – Navy merges RMs and above three Sp(Q) ratings into new “Communications Technician” (CT) rating, consisting of eight branches.
- 1949 – Establishment of the Armed Forces Security Agency, a precursor to the National Security Agency that now provides much of the tasking that the CTs perform.
- 1976 – CT becomes “Cryptologic Technician” rating.
- 2005 – Navy moves Naval Security Group personnel to Naval Network Warfare Command (NETWARCOM).
- 2010 – Navy establishes U.S. 10th Fleet and U.S. Fleet Cyber Command.

Rating Badge

Crossed quill and spark, both pointing down; pen on top with nib to the front.

Branches

In 1948, the CT rating was divided into eight individual rating branches. With the 1976 name change, only six of the original eight branches remained: CTA (Administrative); CTI (Interpretive); CTM (Maintenance); CTO (Communication); CTR (Collection); and CTT (Technical). In 2003, the EW (Electronic Warfare) rating merged into the CTT rating, the CTO rating split into the Information Systems Technician (IT) rating in 2005, and in 2007 CTA merged into the Yeoman (YN) rating. CTN (Networks) was established in 2004 to meet the new demands of cyber warfare threats.

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Individual numbers are approximate for a total of 9,860 CT Sailors.

CTI - 1960

CTM - 720

CTN - 1250

CTR - 3200

CTT - 2730



▲ CTs from the Center for Information Dominance (CID) Corry Station preview the Integrated System for Language Education and Training program, which is being tested by the CID-based Center for Language, Regional Expertise, and Culture; and the Academic Consortium for Global Education. (Gary Nichols/USN)

Becoming a CT

Every CT must be a U.S. citizen and successfully screen through a Single Scope Background Investigation to obtain a Top Secret/Sensitive Compartmented Information (TS/SCI) clearance. There are other specialized requirements, individualized by CT branch, pertaining to ASVAB score minimums and vision/hearing/speech requirements. CTs maintain advancement opportunities consistent with overall Navy averages.

CTRC(SW) Brandon Faulkner aboard USS *Donald Cook* (DDG 75) explained that most CTs receive specialized “A” school training at the Center for Information Dominance (CID) in Pensacola, Fla. Many “C” schools are in Pensacola as well. In recent years, the Navy has moved some of the “C” schools to CID Learning Sites (LSs) throughout the country. Additionally, there is a wide range of fleet schools that are taught at CID LSs. CTI is the only rating that is not instructed in Pensacola; they receive their training at the Defense Language Institute in Monterey, Calif.

Little-Known Facts/Myths

Many ships indicate secure spaces by painting doors blue, including the door to the ship’s signals exploitation space, where CTRs often work aboard

ship. This is not an official security marking, however, said CTT1(SW) Trever Patino, a watch officer at the National Joint Operations Intelligence Center in Washington, D.C. “Just because the door is blue, it may not mean it is restricted. I’ve worked in spaces that had other color doors. The key indicator, no matter the color, is warning labels attached on the door, combination locks, badge readers, and so forth.”

CTR1(SW) William Pykus, assigned to USS *Cowpens* (CG 63) dispelled other common misconceptions. “There are no Marines instructed to kill us if we are about to become captured,” he said. “We are also not James Bond, and we are not all giant nerds that go home and play with our ham radios and pocket calculators.”

Famous CTs

Because of the restricted nature of their work CTs are rarely publicly recognized for their accomplishments. Nonetheless, some community legends have emerged. During the 1920s and 1930s, the Navy ran a class on radio intercept of Imperial Japanese Navy (IJN) communications as tensions in Asia heightened. The first instructor, RMC Harry Kidder, had taught himself IJN’s symbols and graphic representations, and hand-copied intercepts with a pencil while at the

intercept station in the Philippines. Because the classes were held in a wooden structure that had been built on top of the Navy Headquarters building in Washington, D.C., and their contents secret, they became known as the “On the Roof Gang.” These first radiomen were the first Navy cryptologists. Today, NETWARCOM honors outstanding Navy and Marine cryptologists with the “On the Roof Gang” Award.

A more recent hero, CTT1(SW) Stephen Daugherty, was posthumously awarded a medal second only to the Intelligence Cross in the Intelligence



CTT3 Cord Carnes downloads chaff from a chaff launcher aboard USS *Fitzgerald* (DDG 62) before performing routine maintenance. (MC2(AW) William Pittman/USN)



◀ CTR2 Matthew Langston heaves a line aboard USS **Gettysburg** (CG 64) during a replenishment-at-sea. (MC3 Betsy Knapper/USN)

“If you are a person that craves or feeds off of public attention, this is not the job for you,” said CTR2(SW) Ryan Brissette, assigned to *Cowpens*. “The best you can hope for is the self-satisfaction that what you have done has markedly helped, or in some cases saved, the lives of many people you will never know. Sometimes the greatest satisfaction is a pat on the back from your peers knowing that their respect is the only acknowledgement you need.”

Best Reason to be a CT

One of the best reasons to be a CT is job security, said CTR1(SW / AW) Monica Evans aboard *Donald Cook*. CTs seeking career opportunities after the

Navy can find employment in the electronics, signals processing, and computer network career fields in the civilian sector. CTs are also frequently given additional consideration because they hold a high-level security clearance.

According to CTT1 Patino, other benefits of working as a CT include being the first line of warning for protection of the United States; working with a select group of individuals with exceptional abilities; learning and developing strong team, written communication, and analytical skills; and working with unique systems and technology.

Perhaps the best reason to be a CT is the satisfaction of learning a critical and complex rate. “When I first arrived on *Cowpens*, we had six chiefs testing us on how good we were at our job,” said CTTSA Jehan-Paul Leblanc. “Later when my chief gave us our results, he said that one of the senior chiefs had been impressed that I was able to explain some of our systems already, and I had been on board for less than a month.” 🏆 🎖️

Community. “It was an honor for the Intelligence Community to bestow one of its highest awards on Stephen - the National Intelligence Medal for Valor - in deep appreciation for his example of courage,” said retired Adm. Dennis Blair, former Director of National Intelligence. CTT1 Daugherty was killed in Iraq July 6, 2007, by an improvised explosive device after his team successfully completed an important mission.

Hardest Part

“Due to the classification levels and nature of our work, we must constantly monitor our daily conversations with family, friends, and colleagues to ensure we protect the information with which we have been entrusted,” said CTMCM(SW) Christopher Hacker, CTM Technical Advisor.

▶ Snoopie Team Member CTM3 William Kelso aboard USS **Kidd** (DDG 100) takes a picture of suspect dhow in the 5th Fleet area of responsibility. (LS2 Joshua Montes/USN)



Countering the Nuclear Threat The Seventh Angel

By retired Chief Sonar Technician Jeff Edwards

Review by retired Rear Adm. John Waickwicz

For the better part of a half-century, many Americans believed that World War III would occur within their lifetimes. It was widely accepted that direct confrontation between the nuclear superpowers was inevitable. Sooner or later, the delicate balance of power would tip one way or the other, and the United States and the Soviet Union would unleash their nuclear arsenals upon each other. It was not a matter of *if*. It was a matter of *when*.

Since the collapse of the Soviet Union and the Warsaw Pact, the threat of global nuclear conflict has all but vanished from public consciousness. The possibility of a nuclear armageddon — which dominated print headlines and broadcast news coverage for decades — no longer rates a 15-second sound bite on CNN, or a page-6 newspaper story. With a few notable exceptions, the specter of nuclear catastrophe has also disappeared from the pages of military fiction.

Has the threat truly gone away, or have we merely stopped talking about it? *The Seventh Angel*, the latest naval-combat thriller by retired Chief Sonar Technician Jeff Edwards, takes a hard look at these questions. The result is chilling, thought-provoking, and one hell of a good Surface Warfare novel.

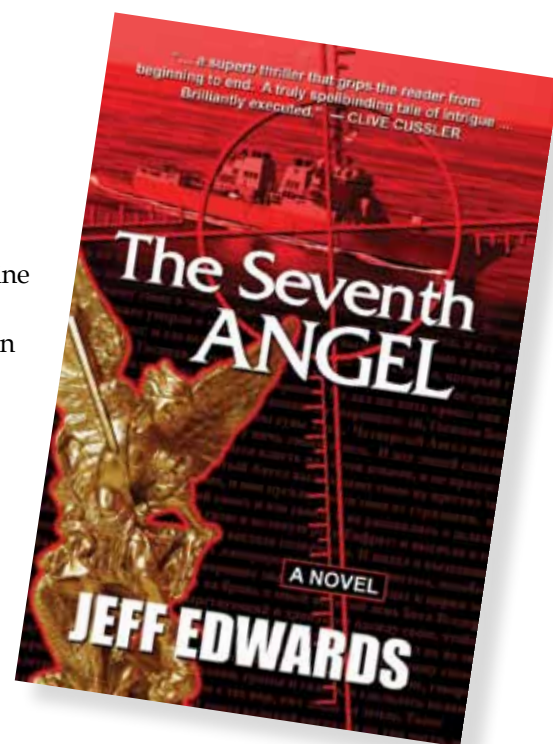
The story follows the exploits of Cmdr. Samuel “Jim” Bowie and the crew of USS *Towers* (DDG 103), a fictional Flight III *Arleigh Burke*-class destroyer with enhanced stealth capabilities. Ordered to the Sea of Okhotsk to monitor a Russian military revolt in Kamchatka, *Towers* gets caught up in a game of cat and mouse

with a rogue ballistic-missile submarine hiding under the Siberian icepack.

What begins as an internal Russian conflict quickly escalates into a global nuclear confrontation when the rogue sub launches a ballistic missile toward the West Coast of the United States. Scrambling to intercept multiple independently targeted warheads as they scream down from the troposphere, the U.S. Ballistic Missile Defense system gets its “baptism by fire” in the truest sense of the phrase.

Putting her stealthy characteristics to optimal use, *Towers* hides when she can and fights when she must — trading missile fire with MiGs and shooting it out with helicopter gunships in a series of intense naval-combat engagements. Somewhere out on the Siberian ice pack, two U.S. Marine Corps Explosive Ordnance Disposal teams have a plan to prevent the submarine from launching its next load of missiles. Unfortunately, the Marines might not survive long enough to put their plan into action.

This book does not depict the idealized vision of technological and human perfection that so often permeates contemporary military thrillers. Vital equipment does not always perform properly and sometimes it fails entirely. The officers and Sailors of *Towers* are not superheroes. They are ordinary men and women, who struggle with fear, doubt, and their own personal inadequacies. They make mistakes. But, despite their lack of Hollywood perfection, they take courage from the




strength of their ship, the importance of their mission, and — ultimately — from each other.

The Seventh Angel explores the challenges of maintaining stability in a world where the integrity of the post-Soviet strategic arsenal is in serious doubt. It considers both the potential benefits and potential limitations of stealth technology in the naval warfare environment. This novel is many things, but above all, it is a celebration of the modern surface navy. The author is proud of his career as a Surface Warrior, and that pride comes through on every page.

The Seventh Angel

By Jeff Edwards (Stealth Books 2010)
336 Pages
ISBN: 978-0-9830085-1-4

The views expressed above are those of the reviewing author. The publication of this review does not imply DoD endorsement of the reviewer or the work reviewed and its author. 

Head Over Heels

By Derek Nelson, Media Division, Naval Safety Center



A long time ago, one of our particularly creative forebears decided to make the big move from four legs to two. This position provided a much better field of vision when looking for something to eat (or detecting something that wanted to eat you). We could also use those extra two appendages for carrying a stick or a rock when prowling the savannah. The unintended consequence was that we could slip and trip in ways previously unimagined, and when we fell, we fell harder and farther.

Had you observed these initial stumbles, you might have thought that our ancestors just hadn't had enough practice walking upright. Well, not exactly. Eons later, people are still slipping and tripping enough to make slips and falls a major cause of workplace lost-time mishaps.

Do-It-Yourself Safety Survey

- Are there three non-skid strips at the tops and bottoms of ladders and at each side of the doors in heavy-traffic areas? If not, install!
- Do ladders, handrails, or hand chains have any loose, missing, or damaged parts? If so, fix!
- Are safety chains and stanchions installed and used around hatch openings? If not, replace!

Shipboard Sailors are no exception, reporting more than 250 falls last year, amounting to almost 2,000 lost workdays. Of these falls, 42 involved 10 or more lost workdays and 27 involved ladders.

Sailors are exposed to increased risks because they live and work aboard something that rocks back and forth, regularly gets wet on the outside, and features a series of ladders and "knee-knockers" that are challenging even when Sailors aren't tired, in a hurry, or multi-tasking.

Staying Grounded

To make sure that conditions are optimal, Naval Safety Center (NSC) survey teams look carefully at two important shipboard features: ladder treads and the three strips of non-skid located on either side of knee-knockers in major passageways.

The non-skid isn't a big problem. When it gets worn, you have to replace it but the task is minor.

Ladder treads are a different matter; repairs aren't too hard but are often ignored. "We find issues with the ladder treads on about half the ships we visit," said Chief Damage Controlman (DCC) (SW / AW) John Ralston, NSC's damage control and firefighting analyst. When the front of a tread gets worn down, you can reverse the surface so the unworn area in the back is in front. When both parts are worn, the tread has to be replaced.

"It isn't expensive, but for some ships, it doesn't seem to be a priority," DCC Ralston observed. "But, with the number of ladder-related slips, falls,


and sprains that end up in the Navy's Web-Enabled Safety System reports, you'd think it would get their attention," he said.

Ashore Isn't Risk-Free

Just because Sailors are on shore doesn't guarantee a slip-free environment, either. Slipping on spilled water on a deck is among the most common falls, whether or not it's rocking at sea. People also slip on recently mopped floors. One Sailor slipped and was injured while he was swabbing a deck. Another slipped and fell down a set of wet stairs during a command field day.

Ice and snow add risk during cold weather. In parking lots, for instance, they take a regular toll on people who hurry, are distracted, or overestimate their traction. One Sailor made it to his car and then slipped while sweeping off the snow. Additionally, people slip on puddles of water from melted snow tracked into hallways or offices.

Watching Your Step

It may seem simple, but we have to pay attention to where we're putting our feet and our surroundings. It's basic situational awareness, on and off duty. We know not to text and drive – texting and walking can be similarly treacherous. 

Healthy Eating Tips for Deployed Sailors

By Hugh Cox, Navy and Marine Corps Public Health Center Public Affairs

Fueling the body is critical for supporting our Sailors' optimal performance, particularly those at sea or serving in other operational environments. To help Sailors make healthier food choices, in 2010 the Navy introduced a nutrition education program throughout its galleys called "Go for Green."

"It's an easy way for Sailors to make healthier choices on the serving line based upon guidelines for calories, total fat, cholesterol, and sodium," said Ms. Sally Vickers, public health educator with Navy and Marine Corps Public Health Center (NMCPHC) public affairs.

The Navy designed its Go for Green nutrition-education component to be identical in all galleys, ashore and afloat, using colors as a quick visual cue to indicate performance. Green indicates a performance food that is lower in fat and packed with nutrients; yellow indicates caution foods that contain medium fat or are more processed. According to Vickers, feedback from the fleet suggests that color-coding takes the guesswork out of making healthier food choices.

"Sailors should watch the quantity they consume of yellow foods," said Ms. Jennifer Person-Whippo, nutrition program manager with the Navy Supply Systems Command, in Mechanicsburg, Pa. "Red warning labels indicate foods that Sailors should consume in limited amounts because they are high in fat and refined sugar.


If a Sailor is trying to reduce fat and calories to maintain or lower weight to within standards, it might be best to avoid the vending machines and ship's store, which are often stocked with high-calorie, high-fat snacks and beverages," said Person-Whippo.

Fruits and vegetables are an excellent source of fiber, vitamins, and minerals without a lot of calories. The Navy standard core menu includes fruits and vegetables at all meals, adding color and variety to the plate. "They can be used as a topping on oatmeal or cold cereal, waffles, or pancakes for breakfast or eaten with meals as a side item such as a hot vegetable or salad," said Person-Whippo. The new recommendation — found at <http://www.choosemyplate.gov/> — is to fill half of the plate with fruits and vegetables.

If a Sailor misses a mess meal, many galleys make fruits available at all times. According to Person-Whippo, snacking on fruits and vegetables between meals is a great way to get in the recommended numbers of servings each day. When it comes to fruits and vegetables, all forms count — fresh, dried, canned, frozen, and juice. The serving size varies with the form (i.e. dried is more calorie dense, so the serving size is smaller).

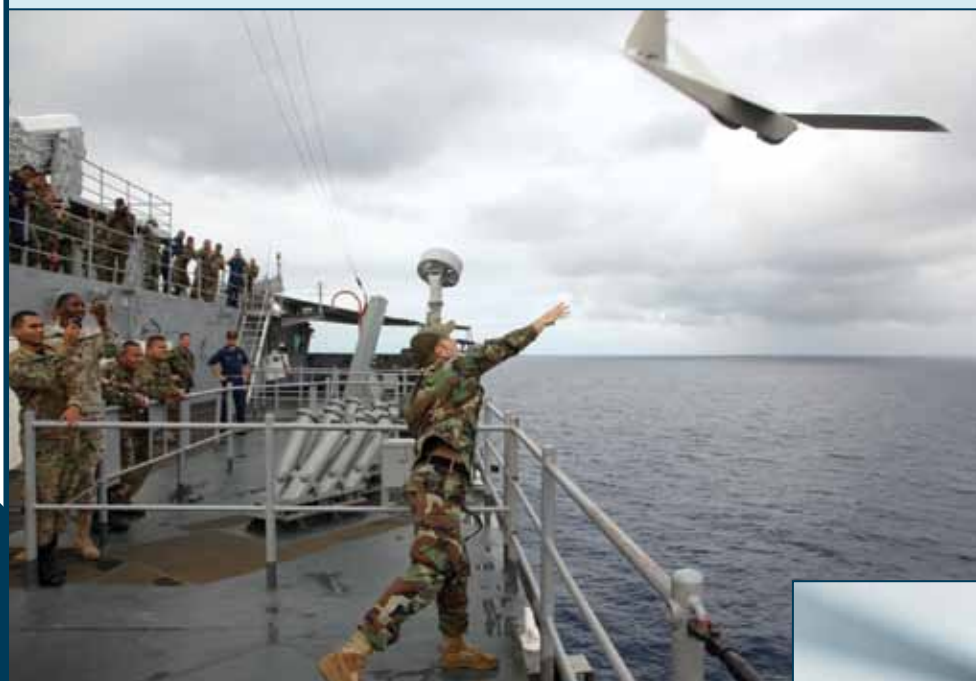
Sailors can learn more about what is considered a serving size and how many servings they need each day, based upon age, gender, and physical activity level, at: <http://www.fruitsandveggiesmatter.gov/>

The "Go for Green" program is a part of the Navy Operational Fitness and Fueling System (NOFFS). Learn more about NOFFS at: <http://www.navyfitness.org/fitness/noffs/> or the "Fit For Duty" article in the summer issue of Surface Warfare.

For more information on nutrition and healthy living, visit the Navy and Marine Corps Public Health Center Web site at: http://www.nmcphe.med.navy.mil/Healthy_Living/ 



Views from the Fleet



◀ Personnel from the Panamanian Public Security Force observe as BM2 Jason Gates launches an Aqua Puma unmanned aerial vehicle from USS **Oak Hill** (LSD 51) as part of *Amphibious Southern Partnership Station 12*, an annual deployment of U.S. military training teams to the U.S. Southern Command area of responsibility. (Sgt. Thomas Childs/USA)

▼ USS **Milius** (DDG 69) transits the San Francisco Bay after participating in San Francisco Fleet Week. (Lt.j.g. Pete Lee/USN)



► Marines assigned to the Maritime Raid Force of the 31st Marine Expeditionary Unit conduct a visit, board, search and seizure drill aboard USS **Germantown** (LSD 42). (MC2 Spencer Mickler/USN)





▲ ET3 Taylor performs maintenance on a radar terminal aboard the guided-missile cruiser USS **Anzio** (CG 68), assigned to CTF 151, a multi-national, mission-based task force conducting counter-piracy operations in the Red Sea, Gulf of Aden, Somali Basin, and Arabian Sea. (MC2 Brian Brooks/USN)



▼ LS1 Calvin Lewis, left, communicates with the central control station as Ensign Naomi Sullivan, force protection officer, and HTC Michael Pavlovick review damage control charts during a fire drill aboard USS **Mitscher** (DDG 57). (MC3 Deven King/USN)



A Thai child holds a sign thanking U.S. Sailors from USS **Mustin** (DDG 89) and members from the Royal Thai Armed Forces during a community service event organized by the Princess Pa Foundation, Thai Red Cross Society. (MC1(SW/AW) Jennifer Villalovos/USN)

Notice to Mariners

Ship Keel Layings:

USS *Zumwalt* (DDG 1000) Nov. 17, 2011

Ship Christenings:

USS *Coronado* (LCS 4) Jan. 14, 2012

Awards:

President's "Building the Future" GreenGov Award:

Winner: Naval Base San Diego

France's National Order of the Legion of Honor (Chevalier Level):

Recipient: Rear Adm. Kurt Tidd, COMUSNAVSO/C4F

Association of Minemen 2011 Mineman of the Year:

Sea Winner: Mineman 2nd Class (SW) Joshua Garza,

MCM Crew Bulwark

Shore Winner: Mineman 1st Class (SW/FMF) Cory Blair,

MCM Squadron 5

Association of Old Crows Outstanding Navy Unit Award:

Surface Winner: Carrier Strike Group 11

2011 Vice Adm. James Bond Stockdale Leadership

Award Winner:

U.S. Fleet Forces Winner: Cmdr. Robert Chadwick, former commanding officer, USS *Roosevelt* (DDG 80)

2011 Navy League Sea Service Awards:

The Adm. Claude V. Ricketts Award for Inspirational Leadership:
E-7 and Above: FCC Michael Brooker, USS *Independence* (LCS 2)

The Captain Winifred Quick Collins Award for Inspirational Leadership:

Enlisted: CMDCM(SW / AW) Susan Whitman,
USS *Abraham Lincoln* (CVN 72)

The Alfred Thayer Mahan Award for Literary Achievement:
Winner: Adm. James Stavridis, commander, U.S. European Command

The Adm. Ben Moreell Award for Logistics Competence:
Officer: Lt. Brandon Carll, Space and Naval Warfare Systems Command

The Naval Intelligence Foundation Award for Exceptional Leadership in Intelligence Support to the Fleet:
Winner: Cmdr. Michael Oluvic, Naval Special Warfare Development Group

The Capt. Arthur L. Johnson Award for Inspirational Leadership:
Winner: Mr. Steven Burdi, USNS *Robert E. Peary* (T-AKE 5)

The Able Seaman Oscar Chappell Award for Outstanding Maritime Stewardship: Winner: Mr. Efren Apostol, USNS *Catawba* (T-ATF 168)

The Capt. David H. Jarvis Award for Inspirational Leadership:
Winner: CWO3 Brian Addicott, USCG, Coast Guard Sector Columbia River, Oregon

The Douglas A. Munro Award for Inspirational Leadership:
Winner: YN1 VanDell Dawson, USCG, Coast Guard Training Center Petaluma, Calif.

2011 COMNAV Region MIDLANT Community

Service Awards:

Personal Excellence Partnership:

Large Shore Command Winner: Naval Station Norfolk

Medium Sea Command Winner: Assault Craft Unit 2

Large Sea Command Winner: USS *Theodore Roosevelt* (CVN 71)

Health, Safety and Fitness:

Small Shore Command Winner: Surface Warfare Officers

School Command

Large Sea Command Winner: Assault Craft Unit 4

Project Good Neighbor:

Small Shore Command Winner: USS *Constitution*

Large Sea Command Winner: Assault Craft Unit 4

Environmental Stewardship:

Large Sea Command Winner: USS *Theodore Roosevelt* (CVN 71)

CNO 2011 Personal Excellence Partnership Flagship Award:

Medium Overseas Command Winner: USS *Cowpens* (CG 63)

2010 Naval Supply Systems Command and Navy Exchange Service Command Award:

Ship's Store Retail and Service Excellence Winner: USS *Leyte Gulf* (CG 55)

Ship Shape:

Congratulations to Cmdr. Tim Gibboney, prospective commanding officer of USS *Rodney M. Davis* (FFG 60), who was the first to identify last issue's ship as Russian Navy destroyer RFS *Admiral Chabanenko* (DD 650).

Submit your command and individual achievements to: surfwarmag@navy.mil

CHANGES OF COMMAND

USS *Gravely* (DDG 107) / December
Cmdr. David Dry relieved
Cmdr. Doug Kunzman

Surface Support Unit GUAM / December
Cmdr. Brian Peterson relieved
Cmdr. Norm Maple

USS *Cole* (DDG 67) / January
Cmdr. Peter Nilsen relieves
Cmdr. Andrew Ehlers

COMDESRON 22 / January
PC Crew *Charlie*
Capt. John Fuller relieves
Capt. Jeffrey Wolstenholme

USS *Preble* (DDG 88) / January
Cmdr. Kurt Sellerberg relieves
Cmdr. Joe Cahill

USS *Samuel B. Roberts* (FFG 58) / January
Cmdr. Robert Williams relieves
Cmdr. Angel Cruz

USS *Bonhomme Richard* (LHD 6) / February
Capt. Chuck Litchfield relieves
Capt. Jonathan Harnden Jr.

USS *Chancellorsville* (CG 62) / February
Capt. Andrew Hesser relieves
Capt. Michael Hegarty

USS *Chosin* (CG 65) / February
Capt. Patrick Kelly relieves
Capt. David Sheridan

COMPHIBRON 5 / February
Capt. Donald Cuddington relieves
Capt. Humberto Quintanilla

USS *Green Bay* (LPD 20) / February
Cmdr. Putnam Browne relieves
Cmdr. Kevin Meyers

USS *Iwo Jima* (LHD 7) / February
Capt. Grady Banister relieved
Capt. Thomas Chassee

MESG 2 / February
Capt. James Hamblet relieves
Capt. Paul McElroy

USS *Mitscher* (DDG 57) / February
Cmdr. Monika Stoker relieves
Cmdr. Brian Sorenson

MSRON 4 / February
Cmdr. Michael Dillender relieves
Cmdr. Robert Klaszky

RIVRON TWO / February
Cmdr. Michael Vecerkauskas relieves
Cmdr. Clay Wilson

USS *John Paul Jones* (DDG 53) / March
Cmdr. Jon Duffy relieves
Cmdr. Chris Cegielski

USS *McCampbell* (DDG 85) / March
Cmdr. Tom Dixon relieves
Cmdr. Steve Demoss

USS *Oak Hill* (LSD 51) / March
Cmdr. Kevin Lane relieves
Cmdr. David Bauer

USS *Whidbey Island* (LSD 41) / April
Cmdr. Vernon Stanfield relieves
Cmdr. Eric Conzen

ALL O-3/O-4 COMMANDS

PC Crew *Alpha*
PC Crew *Bravo*
PC Crew *Charlie*
PC Crew *Delta*
PC Crew *Echo*
PC Crew *Foxtrot*
PC Crew *Golf*
PC Crew *Hotel*
PC Crew *India*
PC Crew *Juliet*
PC Crew *Kilo*
PC Crew *Lima*
PC Crew *Mike*

Lt. Cmdr. Chris Riley
Lt. Cmdr. David Coles
Lt. Cmdr. Austin Duff
Lt. Cmdr. Jason Miller
Lt. Cmdr. Kathryn Wijnaldum
Lt. Cmdr. Daniel Reiher
Lt. Cmdr. Marcus Devine
Lt. Cmdr. Rob McFarlin
Lt. Cmdr. Christopher Schwarz
Lt. Cmdr. John Baggett
Lt. Cmdr. Benjamin Ventresca
Lt. Cmdr. Edward Bertucci
Lt. Cmdr. Steven Schmidt

MCM Crew *Bulwark*
MCM Crew *Conflict*
MCM Crew *Constant*
MCM Crew *Dominant*
MCM Crew *Exultant*
MCM Crew *Fearless*
MCM Crew *Leader*
MCM Crew *Persistent*
MCM Crew *Reaper*
MCM Crew *Suevve*
USS *Avenger* (MCM 1)
USS *Defender* (MCM 2)
USS *Guardian* (MCM 5)
USS *Patriot* (MCM 7)

Lt. Cmdr. Robert Sparling
Lt. Cmdr. Courtney Minetree
Lt. Cmdr. David Taft
Lt. Cmdr. Matthew Erdner
Lt. Cmdr. Edward Pledger
Lt. Cmdr. Lee Shorter
Lt. Cmdr. Morgan Roberts
Lt. Cmdr. Vic Sheldon
Lt. Cmdr. Wayne Liebold
Lt. Cmdr. Andrew Bucher
Lt. Cmdr. Patrick Sullivan
Lt. Cmdr. Todd Levant
Lt. Cmdr. Timothy Carter
Lt. Cmdr. Suzanne Schang

COMMANDER COMMAND AFLOAT

Lt. Cmdr. Gregory R Adams
Lt. Cmdr. Keith T Adkins
Lt. Cmdr. Gervy J Alota
Lt. Cmdr. Brian S Amador
Lt. Cmdr. Edward A Angelinas
Lt. Cmdr. Michael L Atwell
Lt. Cmdr. Spencer P Austin
Lt. Cmdr. Joseph A Baggett
Lt. Cmdr. Casey B Baker
Lt. Cmdr. Bryce A Benson
Lt. Cmdr. Edward P Bertucci
Lt. Cmdr. John R Bowen
Lt. Cmdr. Harold W Bowmantrayford
Lt. Cmdr. Kurt A Braeckel
Cmdr. Michael D Brasseur
Lt. Cmdr. Daniel E Broadhurst
Lt. Cmdr. Kenneth R Brown
Lt. Cmdr. Nathaniel H Brown
Lt. Cmdr. Elaine A Brunelle
Lt. Cmdr. Brandon J Burkett
Lt. Cmdr. Tyrone Bush
Lt. Cmdr. Kimberly D Bynum
Lt. Cmdr. Russell J Caldwell
Lt. Cmdr. Claudine Caluori
Lt. Cmdr. Emily A Cathey
Lt. Cmdr. Adam G Cheatham
Lt. Cmdr. Thomas G Chekouras
Lt. Cmdr. Matthew W Cieslukowski
Lt. Cmdr. Gilbert E Clark Jr.
Lt. Cmdr. Colin Corridan
Lt. Cmdr. Shawn M Cowan
Lt. Cmdr. Marc E Davis
Lt. Cmdr. Janet H Days
Lt. Cmdr. Troy R Denison
Lt. Cmdr. Michael P Desond
Lt. Cmdr. Jennifer L Eaton
Lt. Cmdr. Joseph E Fals
Lt. Cmdr. Christopher M Farricker

Lt. Cmdr. Samantha A Farricker
Lt. Cmdr. John K Fleming
Lt. Cmdr. Vincent A Fortson
Lt. Cmdr. Mario T Freeman
Lt. Cmdr. Bryan S Gallo
Lt. Cmdr. Raymond J Gamicchia
Lt. Cmdr. Patrick L German
Lt. Cmdr. Fiona C Halbritter
Lt. Cmdr. Mark W Haney
Lt. Cmdr. Marc A Hanson
Lt. Cmdr. William M Harkin
Lt. Cmdr. Gary A Harrington II
Lt. Cmdr. Mary K Hays
Lt. Cmdr. Antonio L Hyde
Lt. Cmdr. David V Jaeger
Lt. Cmdr. Michael R Johnson
Lt. Cmdr. Paul J Kaylor
Lt. Cmdr. Philip E Knight
Lt. Cmdr. Michelle S Korn
Lt. Cmdr. Jennifer M Krug
Lt. Cmdr. Timothy D Labenz
Lt. Cmdr. Jason Labott
Lt. Cmdr. Kenneth R Lieberman
Lt. Cmdr. Amy E Lindahl
Lt. Cmdr. Matthew J Mackay
Lt. Cmdr. James R Malone
Lt. Cmdr. Antonio P Matos
Lt. Cmdr. Allen L Maxwell Jr.
Lt. Cmdr. Karl F McCarthy
Lt. Cmdr. John A McConnell
Lt. Cmdr. Simon C Mckeon
Lt. Cmdr. Douglas K Meagher
Lt. Cmdr. Kevin P Meehan
Lt. Cmdr. Jesse M Mink
Lt. Cmdr. Matthew Molmer
Lt. Cmdr. Jessica L Morera
Lt. Cmdr. James A Murdock
Lt. Cmdr. Riley W Murdock

Lt. Cmdr. Patrick R Murphy
Cmdr. Thomas E Myers
Lt. Cmdr. Benjamin W Oakes
Lt. Cmdr. Paul D Obrien
Lt. Cmdr. Todd D Peters
Lt. Cmdr. Kenneth S Pickard
Cmdr. Eric W Rasch
Lt. Cmdr. Lawrence M Repass
Lt. Cmdr. Jon P Rigby
Lt. Cmdr. Donovan C Rivera
Lt. Cmdr. Richard A Robbins Jr.
Lt. Cmdr. Errol A Robinson
Lt. Cmdr. Jose A Roman
Lt. Cmdr. Scott A Rosetti
Lt. Cmdr. Edward A Rosso
Lt. Cmdr. John W Ryan
Lt. Cmdr. Alfredo J Sanchez
Lt. Cmdr. Matthew D Scarlett
Lt. Cmdr. Jon C J Sego
Lt. Cmdr. Colby W Sherwood
Lt. Cmdr. Allen M Siegrist
Lt. Cmdr. Andria L Slough
Lt. Cmdr. Leslie D Sobol
Lt. Cmdr. Jason T Stepp
Lt. Cmdr. Jean M Sullivan
Lt. Cmdr. Courtney P Taft
Lt. Cmdr. Jeffrey S Tamulevich
Lt. Cmdr. Kyle H Turner III
Lt. Cmdr. Benjamin R Ventresca
Lt. Cmdr. Blandino A Villanueva
Lt. Cmdr. Stefan L Walch
Lt. Cmdr. Francis J Walter III
Lt. Cmdr. David W Walton Jr.
Lt. Cmdr. Steven H Wasson
Lt. Cmdr. Anthony L Webber
Cmdr. Michael R Wohhaas
Lt. Cmdr. Keith C Woodle

OFFICERS SELECTED FOR SURFACE WARFARE MAJOR COMMAND

Capt. Heidi Agle
Capt. Christopher Barnes
Cmdr. Warren Buller
Cmdr. Francis Castellano
Cmdr. Robert Chadwick
Capt. Richard Cheeseman
Cmdr. Wyatt Chidester
Capt. Thomas Dearborn
Cmdr. Richard Dromerhauser
Capt. Scott Dugan
Cmdr. Christopher Engdahl
Cmdr. James Garner
Cmdr. David Glenister
Cmdr. Charles Good
Cmdr. William Grotewold
Cmdr. William Guarini
Cmdr. Sam Hancock Jr.
Cmdr. Martin Hardy
Cmdr. Michael Huck
Cmdr. Curt Jones
Capt. Kurt Kastner
Cmdr. Robert Katz
Cmdr. Keith Knutsen
Cmdr. Timothy Kott
Capt. Glenn Kuffel Jr.
Cmdr. Lawrence Legree
Cmdr. Michael Lehman
Cmdr. Glen Leverette
Cmdr. Todd Lewis
Cmdr. Brendan McLane
Cmdr. Keith Moore
Cmdr. Stephen Murphy
Cmdr. Mark Oberley
Cmdr. Fred Pyle
Cmdr. Kevin Robinson
Capt. Brian Shipman
Capt. Michael Sparks
Cmdr. Lyle Stuffle
Cmdr. Marvin Thompson
Capt. Ryan Tillotson
Capt. Dean Vesely

COMMANDER COMMAND SPECIAL MISSION

Cmdr. Coy M Adams Jr.

SAFFiR Shipboard Autonomous Fire Fighting Robot

SAFFiR will operate as a firefighting shipmate, reducing operational risk to Sailors in hazardous environments.

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CREATIVE ARCHITECTS:

ROBOTICS AND MECHANISMS
LABORATORY (RoMeLa)
VIRGINIA TECH

Upper body will be capable of manipulating fire suppressor and throwing peat grenades.

Sensor suite includes stereo IR camera to see through smoke.

Battery compartment holds enough energy for 30 minutes of firefighting.

Lightweight, low-friction linear actuators improve efficiency and control.

Parallel actuation of hip and ankle provide greater accuracy, speed and torque.

Titanium springs enable improved dynamics and advanced control algorithms.

Six-axis force/torque sensor enables robust feedback while walking.

Lightweight, central aluminum structure efficiently transfers loads through robot.



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